рни РТО-14 1EV. 7-801		C R	00/		' A 1 E	NT AND THA	T OF COMMERCE	ATTY. DOCKET NO. 7913Z	s	580,246	** + 1 ->	
LIS	61,0	~199 ~199	veral		ts il	BY APPL)	Donald R. Huffi	G	noup	_	
		TRAI	JE MA				U.S. PATENT		<u>i</u> _			
NAMINER		DOCU	MENT	NUMB	ER	DATE		NAME .	CLASS	SUBCLASS	FILING IF APPRO	DATE
- (1)	۸۸	4 1	3 ;	26	7 1	1/2/79	Deininger e	et al.	252	445		
	AB			11								
	AC			11	Ö				100	-		
	AD	FI		11	T				1		11	
	AE											
	AF											
	AG											
	АН											
	Al											
	AJ								TIPE	10000		
	AK											
							FOREIGH PAT	ENT DOCUMENTS			<u> </u>	
		poc	UMEN	T NUM	BER	DATE	Co	שרווע	· CLASS	SUBCLASS	TRANSL	
	AL								-		763	HO
	АМ								THE T	No.	li-i	
	на							4,48,40				
	AO			Ŋij								
	AP											
				0	THE	R PRIOR A	RT (Including Auth	or, Title, Date, Pertinen	Pages, Etc.	,	-L	.1
51-16	AR		Wi	lliam	в, C	lose packi	ng of spheres,	J. Chem. Phys. 87(7)	, October 1	, ·1987 page:	4206-42	211
	AS					······································		ton Vol. 25, No. 6,			YEMPEP	TURE
	-	\square				·····		THE ICOSAHEDRAL C		··	al Physic	al.
50 K	АТ							3, 1987, pp. 501–503			-1	
EXAMINE	R	11	//	_	/			DATE CONSIDERED			· ·	

and the State of the Community of the Co

LIST	av	se se	vetal	R.T. C	TED	BY APPL	AT OF COMMERCE	7913Z APPLICANT Donald R. Huffman, et al. FILING DATE September 10, 1990 Sheet 22 of 30 SERIAL HO. 580,246; 53 GROUP				
	13	19	6 92 92	.87	/			L	1990			
EXAMINER		17.00	PHINE THE				U.S. PATENT		·	1	511.111.0	DATE
HITIAL		DOCK	MENI	1	BER	DATE		HAME	CL ASS	SUBCLASS	IF APPRO	PRIATE
	AA	_ -										
	AB											
	AC											
	AD		11									
	AE											
	AF						·				 	
	AG		11	1	\vdash						l	
	AH			+								
	AI	777	T	ΠĒ	Ž.			· · · · · · · · · · · · · · · · · · ·				
	AJ	+	+	+				-		-		
1	AK		+							-		
			Ш		ш	L	I FOREIGN BATE	ur pociusuri				
,		poc	UMEN	T NU	MBER	DATE	7	NT DOCUMENTS	CLASS	SUBCLASS	TRANSL	ATION
	AL	_	150		T				CEASS	30000	YES	но
					171					-	-	
	ММ		- -		11						1	
	ИА						<u> </u>					
	AO											
	AP							,				
	,				OTHE	R PRIOR A	RT (Including Auth	or, Title, Date, Pettine	ent Pages, Etc.)		
	AR		Ko	wace	vic,	et al. On	the Hybridizati	on in Some Archimed	Sean Carbon C	lusters, In	ternation	al
56-1	Ť		Jc	uma	l of	Quantum (1	nemistry Symposi	um 21, (1987) pp.	589-593			
,			Ro	sen,	et a	l., Optic	al Spectrum of th	e Icosahedral C ₆₀ -'	'Follene 60":	A Challen	ge for La	ser
501	AS							I, Proceedings of t				
	АТ					pp. 250-2						/
EXAMINE	ER					Bull		DATE CONSIDERED				

and the second of the second o

ronu PID- inev. 7-eoi LIS	ST OF	NO-K	ereral ROO	T CI	TED	BY APPI		7913Z APPLICANT Donald R. Huf FILING DATE September 10,	R. Huffman, et al. ber 10, 1990				
	;	JU	įΛ ,	1			U.S, PATENT	DOCUMENTS					
EXAMINER United	1.3	poc)	ÎNENT	HUME	PER	DATE		NAME	CL ASS	SURCLASS	FILING IF APPRO	DATE	
	AN	TOS.	1 18	1	7								
	AB		TT										
	AC			11		-				-	-		
	AD		TT	++						_			
	AE		++	╁┪	- -					_			
	AF		+-	+	- -		<u> </u>						
	AG		+	┪┪	-								
	AH	\vdash		11		<u> </u>							
	AI			1	EKE			· · · · · · · · · · · · · · · · · · ·					
	LA		+	+	-					15-10			
	AK		-		-		-		-				
	<u></u>	Ш	11	11		L	FOREIGN PATE	NT DOCUMENTS			<u> </u>		
		000	UMEN	r NUM	BEN	DATE	T	JHTRY	CLASS	SUBCLASS	THANSL	ATION	
	AL	1-			- T-					30000	YES	МО	
	Ам		+		THE PERSON	11.0	1						
	-		- -	- -		4)							
	AH												
	AO		-										
<u> </u>	AP					<u> </u>							
								r, Title, Untr. Pertine					
961	AR							cosahedral C ₆₀ , Ph			Physics		
	_		Thi	rd Se	ries	s, Volume	36, Number 10, N	ovember 15, 1987, p	pp. 4579-458	5			
9616 9616	AS		Fow	ler,	et a	ll, The L	eapfrog Principl	e: A Rule for Elec	ctron Counts	of Carbon C	lusters,		
9001		1	J. (Jhem.	Soc	., Chem.	Commun., 1987 p	o. 1403-1405					
-1	AT		Alm	lof,	et a	11., Theor	etical Methods a	nd Rsults for Elec	tronic Stru	ture Calcul	ations or		
1/10	J ^'							S Symposium Series				<u> </u>	
2000			vest.						, 150//	H- 2240			
EXAMIN	ER	لبا	611	//	, ,	111	<i>p</i>	DATE CONSIDERED	2/ /				

*EXAMINER: Initial If reference considered, whether ar not cliation is in conformance with MPEP 609; Drow fine through cliation if not in conformance and not considered. Include capy of this form with next communication to applicant.

EXAMINER

1.054 1.00 mg/s

DATE CONSIDERED

#12 actact 01/580246

FORM PTO-14 INEV. 7-801	49			U.S PAT	OEPARTM	ENT OF COMMERCE	7913Z		MAL NO. 580, 246	of	
LIST	OF.	PRIOR-	TRT .	CITE	D BY API	?LICANT	APPLICANT			.	}
	f(U	se seve	912	heets	il necesse	ire)	Donald R. Huf				
	61	JUN		1		•	September 10,	, -	nour		
	10.	26 1992	žő	i)		U.S. PATENT					
EXAMINER		BORNOS	MIRS N	IMBER	DATE		HAME	CLASS	SUBCLASS	FILING IF APPRO	DATE
	^^									77 27 110	77111212
`	AB		11	11					ļ		
	AC								-		
	AD						,		-		
	ΛE					=	•				
	AF						· · · · · · · · · · · · · · · · · · ·		-/		
	AG		11			1					-
	АН										
	Al						,			 	
	٨J									-	
	AK		11								
						FOREIGH PAT	ENT DOCUMENTS			-L	
7-10-1		DOCUM	EHT N	UMBE	n DATE	C	שאדתע	CLASS	SUBCLASS	TRANSL	ATION
	AL				71					YES	NO
1	АМ							13011	1		-
	АН									_	-
ĸ.	AO								3	-	
	AP									-	-
				OTH	ER PRIOR	ART (Including Aut	ior, Title, Date, Perline	ent Pages, Etc.)		٠
		F	₹andi(c, et	al., On	the Aromatic Stab	ility of a Conjugate	ed C. Cluste	er, Croatic	a Chemica	1
sall	AR					p. 595–604		- K.			
-10							uctural Chemistry of	f Cartallin	Cardana G	0.1	
501(501(AS					87, pp. 483-527	social diametry of	- Crystalline	Carton, Sc	<i>N</i> . Sc1.	Rev.
		5		lz, e	t al. Fl	emental Carbon Co	cos T Am Chan S	~ 1000 110			
56-10	АТ				, 121.0	C	ges, J. Am. Chem. So	1900, 110	, tb- 1113-	-117/	
EXAMINE	R		11	n	10		DATE CONSIDERED	D .:			
	21	well.	-	//			0/	7/97			
	00		2	100				177 6			

ronm PTG- inev. 7.00)	1449	- 1×0 JUN	ON	1.		BY APPL	TOF COMMERCE	7913Z		Sheet 6 SEMIAL NO. 580,246		
Lis								Donald R. Huf	fman et	al.	•	
	(U	મણે ુૈકે	Breruf	\$#//ycc	:ts if	necessory)	FILING DATE	India et a	GNOUP		
			18 BE 10	7				September 10,	1990			
		ing					U.S. PATENT	DOCUMENTS				
EXAMIHER HITIAL		000	MENT	NUME	en	DATE		HAME	CLASS	SUBCLASS	FILING	PRINTE
	AA											
	AB											
	AC			11								
	AD		1-1-		_							
- · · · · · · · · · · · · · · · · · · ·	ΑE		11	11	11							
	AF		11	11				······································				
	AG				11							
	АН		11		1							
	Al	F [9]	11	31	A A							
	AJ.								_		-	
	AK		-								-	
			1	نــــــــــــــــــــــــــــــــــــــ	٠	L.	FOREIGN PAT	ENT DOCUMENTS			.l	
		000	UMEH	T NUM	BER	DATE	co	DUNTRY	CLAS	SUBCLASS	TRANSL	ATION
	AL			Ť	7						163	
	AM						1					
	AH										-	-
	AO		Ä									-
	AP				11							-
		·		 -	THE	R PRIOR A	RT (Including Auth	or, Title, Date, Pettine	nt Pages. Et	l e.)		
			O'B			·		minsterfullerene an		·	ions,	
50-16	AR		-				January 1, 1988	The second secon				
			_		_			y of Relative Stabi	lities of C	Co(I,) and C	(D_)	G 39-
		1-						25 (1988) pp. 155-:		ω h	/0`5h′	
50-1(50-1(AS		Pha	æ cr	ustei	LO/ II RELIIL	dimited Acta, 1	= (±00) pp. 155-				
5615 5615								g in non-icosahedra		usters, Theo	r Chim A	cta (190

*EXAMINER: Initial II relevence considered, whether or not citation is in conformance with MPEP 609; Drow line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

CON PTO.1		PŔIO	R ÂŘ		B. DEPARTMENT AND TRA	TOF COMMERCE	7913Z APPLICANT Donald R. Huf		Sheel / 580,246	
···	ĵυΙ	2	781 6 92		if necessary	•)	September 10,		GROUP	
	E			\$/		U.S. PATENT	DOCUMENTS			
XAMINER		poct	MENT	NUMBER	DATE		HAME	CLASS	SUBCLASS	FILING DATE
	۸۸									
	AB									
	AC									
	AD		H	111						
	AE	-		+++						
	AF	-	╂┼	1-1-1				·		
	AG	\dashv	+-	+++	- · · · · · · · · · · · · · · · · · · 	<u> </u>			_	<u></u>
	АН		++	- - -	-					<u> </u>
	Al	-	+	+	_		***			
			++	+			<u> </u>			
	AK	-	┼┼							
				للل		<u> </u>				
		noc	IIM EM S	r NUMBE	n DATE		NT DOCUMENTS			THANSLATION
					DATE -	-	UNTRY	CLAS	SUBCLASS	YES NO
	AL	-	-		-					
	AM		11							
	АН						ep-10-4-1			
	AO									
	AP									
							or, Title, Date, Pertina			
SAL	AR						tigation of Franck-			·
			Ele	ctronic	: Spectra of	Buckminsterfull	erene, Chemical Phy	sics Letter	s, Vol. 144,	No. 1,
	AS		Feb	ruary 1	.2, 1988, p	p. 31=36		200		
5 GK	AT		Lege	er, et	al., Remark	able candidates	for the carrier fo	the diffuse	interstella	r bands: C_±
> · /	\ ^`									
EXAMIN	ER		10	n N	11/		DATE CONSIDERED			

and the state of t

anu PTO-1 nev. 7-801		75/2	JN 6		1.5. E	PRATIMEN T AND THA	T OF COMMERCE DRMARK OFFICE	7913Z		Sheet8 SERIAL HO. 580,246	
LIS.	TOF	PRIC	æ2∧r	TEST	ED	BY APPLI	ICANT	Donald R. Huf			
	ıψ	AC. H	DEMA	Cultecu	S 11	necessary,)	September 10,		апоин	
							U.S. PATENT	DOCUMENTS		L	
XAMINER		DOC	MENT	нимві	ER	DATE		NAME	CLASS	SUDCLASS	FILING DATE
	44										
	AB				П						
	AC										
	AD				\sqcap				10		
	AE			11	11						
	AF				\sqcap		1.	1			
	AG		T								1
	АН		11								
	Al				П						-
	AJ										-
	AK						<u> </u>				
		l					FOREIGN PATI	ENT DOCUMENTS			_l
9		500	UMEH	THUME	ER	DATE	co	UNTRY	CLA	SS SUBCLAS	TRANSLATION
	AL										- ' · · · · · · · · · · · · · · · · · ·
	АМ										
	АН				1						
	AO										
	AP				1						
				OT	HEF	PRIOR AF	LT (Including Auth	or, Title, Unic, Pettin	ent Pages, E	c.)	_11
cz 10	AR		Aih	ara, e	et a	l., Spher	ical Aromaticity	of Buckminsterful	lerene, Bul	1. Chem. Soc	. Jpn. 61, (19
501			pp.	2657-	-265	9					
56-16	AS		Sta	ntan,	et	al., Norme	al Vibrational M	10des of Buckminste	rfullerene,	J. Phys. Ch	em., 1988, 92,
56-10	"			2141-							
ccK	АТ		Bal	asubra	men	ian, et al	., Computer Ger	eration of Spectra	of Graphs:	Application	ns to Coo
20.								of Computational Ch			
EXAMINE	R	1	//	7		111		DATE CONSIDERE	0/		,, pp/ 10
	// K	دسد	11	·	La	./(17/9	_	

5, 1, 1

LIST OF	PRIOR	ART	CITED	BY	APPLICANT
---------	-------	-----	-------	----	-----------

State of the State of

A 64 1 1 1

FORM PTO-1449

(Use several sheets if necessory)

7913Z	580,246
Donald R. Huffman	, et al.
September 10, 1990	GROUP

						I Hecessory	, 	September 10		BROUP	
							U.S. PATENT	DOCUMENTS			
HITTAL HER		000	UMEN	IT NU	MBER	DATE		NAME	CLASS	SUBCLASS	FILING DATE
	AA										
	AB										
	AC										
	AD		I						TIME TO		
	AE							-			
	AF			П			•				
	AG			П							
	AH									-1.	
	AI										
	AJ										
	AK								4		
							FOREIGH PAT	ENT DOCUMENTS			<u></u>
		00	CUME	ити	UMBEI	DATE	С	OUNTRY	CLASS	SUBCLAS	THANSLATION YES NO
	AL										
	АМ										
	ИА		T		2						
	AO					M					
	АР										
					OTIII	R PRIOR AI	RT (Including Aut	ior, Title, Date, Perlin	ent Pages, Ste	.)	_1
	AR			Wu,	et al	., Vibratio	nal Motions of	Buckminsterfullere	ne, Chemical	Physical Le	tters,
SCI	\			Volu	me 13	7, number 3	, June 12, 198	pp. 291–294			
60	7.	Г		Slan	ina, e	et al., C	(g), C ₇₀ (g), S	aturated Carbon Vapo	our and Incre	ase of Clus	ter Population
56-1	As		1					Quantum-Chemical and			
								n. Volume 52, (198			
	^1										
EXAMIN	ER	1	-	2 .	1	1		DATE CONSIDERE	D /		
	2	<u>C</u>	1	2-2	le	K			8/17,	193	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Drow fine through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

DATE CONSIDERED

*EXAMINER: Initial II rolerence considered, whether or not citation is in conformance with MPEP 609; Drow line through citation il not

in conformance and not considered. Include copy of this form with next communication to applicant.

EXAMINER

Commence of the Commence of th

roma PTO- ingv. 7.00i						NT DNA TN	NT OF COMMERCE ADEMARK OFFICE	ATTY. DOCKET NO. 7913Z		Sheet		56
LIS	ST OF	PRIC	R AF	ίτ ci	TED	BY APPL	-ICAHT	Donald R. Hui	fman, et	al.	: 1	
··		/ ዘመ ዘ	evera:	she	ets ji	l necessar	y·)	September 10, 1990				
	,						U.S. PATENT	DOCUMENTS				
HITIAL		DOC	JMEHT	NUM	BER	DATE		HAME	CLASS	SUBCLASS	FILING	DATE
	AA											
	AB				17							
	AC		11		7							
-	AD		T			-		·		-		
	AE		++	+	+							
	AF		++	- -	-		-			_	 	
	AG		+	- -	- -	<u> </u>					-	
	AH		╂	- -	-			·····			-	
	Al		╁┼	+			-				-	
					rei e							
	AJ		+	-	-							
	12		Ш	1	Ш	<u>i</u>	1					
	T-	T					T	HT DOCUMENTS				
	-	-	NBMU	1 404	ABER T	DATE	Co	UHTRY	CLASS	SUBCLASS	YES	HO
	AL		-	100								
	AM		11									
	АН									7		
	AO						1			N. Carrier		1
	AP											
				q	THE	R PRIOR A	RT (Including Autho	r, Title, Date, Perline	mt Padas, Etc	.)		J
ac 10	AR		Soc	ott,	et a	l., Benzer	ne Ring Contracti	ons at High Temper	atures, Evid	Bence from t	eh Theme	ıl
56 K			Int	terco	nven	sions of A	Aceanthrylene, Ac	ephenanthrylene, a	nd Fluoranti	nene , J. Am	. Chem. S	æ.
	AS		196	37, 1	09,	pp. 5461-5	5465					
												· · · · · · ·
./			Hary	rden,	et a	al./N/bond	ling in the icose	hedral C ₆₀ cluster	, Physical F	Review B. Vo	lima 36.	
56K	- ^1						15, 1987, pp. 501		, 3444			
EXAMIN	ER	-/	//	7 5		. 1-		DATE CONSIDERE				
		1/				///			11. 1			

The state of the second section of the second

U.S. DEPARTMENT OF COMMERCE PATENT AND THADRMANK OFFICE ATTY. DOCKET NO. 7913Z 580,246 UN LIST OF PRIOR ART CITED BY APPLICANT APPLICANT. Donald R. Huffman, et al. (Use several sheets if necessary) FILING DATE GROUP September 10, 1990 U.S. PATENT DOCUMENTS EXAMINER INITIAL DOCUMENT NUMBER DATE HAME FILING DATE CLASS SUUCLASS A۸ AB AC AD AE AF AG AH AL L A AK FOREIGN PATENT DOCUMENTS TRANSLATION DOCUMENT NUMBER DATE COUNTRY CLASS SUBCLASS YES AL MA AN AO OTHER PRIOR ART (Including Author, Title, Untr. Perlinent Pages, Etc.) Laszlo, et al., On the Geometricial Structure and UV Spectrum of the Truncated Icosahedral C Molecule, Chemical Physics Letters, Volume 136, number 5, May 15, 1987, pp. 418-422 Elser, et al., Icosahedral Co: an arcmetic molecule with a vanishingly small ring current

*EXAMINER: Initial If reference considered, whether or not citation is in conformance with MPEP 609; Draw fine through citation if not in conformance and not considered. Include copy of this form with next communication to applicant,

chimie physiugue, 1987, 84, n. 7-8 DATE CONSIDERED

EXAMINER

The Maria State of the Control of

magnetic susceptibility, Nature Vol. 325, February 26, 1987, pp. 792-794

Coulombeau, et al., Calculs de Proprietes Electroniques et des Frequences Normales de

Vibration D'Agregats Carbones Formant Des Polyedres Reguliers et Semi-Reguliers, Journal de

TORIA PTO-1		>44		PA	IENT AND TH	NT OF COMMERCE	7913Z	1	Sheet 1 SERIAL 110. 580, 246		
LIS	T OF (U	80 KQ1	reral :	sligera	D BY APPL	ICANT ')	Donald R. Hu		al.	- 111 10: 5 % 111	
	, ;	้ากล		=/		U.S. PATENT	ATENT DOCUMENTS				
XAMINER		OO.CU	AENT I	NUMBER	DATE		NAME	CLASS	SUBCLASS	FILING DATE	
	AA								_		
	AB										
	AC								1		
7.7	AD						•	_			
	AE										
	AF	\dashv		1-1-1	1.					<u> </u>	
	AG	_	\vdash	1-1-1							
	AH			H = H					2 14		
	AI						· · · · · · · · · · · · · · · · · · ·				
	AJ		Π								
	AK		\vdash								
			ــــــــــــــــــــــــــــــــــــــ	ليابال		FOREIGH PAT	ENT DOCUMENTS			J	
		0000	MENT	NUMBE	DATE	cc	DUNTRY	CLASS	SUBCLASS	TRANSLATION YES HO	
	AL										
	АМ					1					
	на										
	AO		J. H								
	AP										
				OTI	ER PRIOR A	RT (Including Auth	or, Title, Date, Perti	nent Pages, Etc	.)		
5011	AR		Fow]	ler, H	ow Unusual	is C ₆₀ ? Magic Nu	mbers for Carbon C	Clusters, Che	mical Physic	s Letters,	
			Volu	me 13	l, number 6	, November 21, 1	986, pp. 444-450				
11	AS		Hart	er, e	tal., Rovil	orational Spectr	al Fine Structure	of Icosahedra	al Molecules	, Chemical	
Sak			Phys	sics L	etters, Vol	ume 132, number	4,5, December 19,	1986, pp. 38	7–392		
	АТ										
									•		
HIMAX3	ER /		1		1-		DATE CONSIDER	ED /			

State of the state of the state of

ronia PTO-l ingv. 7.401 LIS	γ Toje	PRI	DON DRAA	TCIT	ED I	EPARTMENT AND THA)	Sheet 14 of 56 E ATTY. DOCKET NO. 7913Z APPLICANT Donald R. Huffman, et al. FILING DATE September 10, 1990 NT DOCUMENTS						
				·			U.S. PATENT	DOCUMENTS						
HITIAL		poc	THBMU	HUMBE	R	DATE		HAME	CLASS	SUBCLASS	FILING	DATE		
	AA													
	AB													
	AC							**************************************						
	AD		1-1-							1				
	AE		++	+						-				
-	AF		11	11	11									
	AG		┪	_	+			,		-		-		
	AH				+1					-	<u></u>			
	Al			+	H									
	AJ		++	11	+									
	AK		-				1			-				
	<u> </u>	لـــا	للل	11	11		EODEICH DAT	ENT DOCUMENTS						
		000	UMEN	T NUME	En	DATE	T	UNTRY	CLASS	Tauran	TRANSL	ATION		
	AL									SUBCLASS	YES	NO		
-	-			- -										
	AM		\dashv	-1-1	11		L							
	Ан													
	AO								111111111111111111111111111111111111111	134		Y.		
	AP									B				
				01	HER	PRIOR AF	RT (Including Auth	or, Title, Unte, Pertin	ent Pages, Etc	.)		J		
// //	AR		Me	rynid	c, et	al., Lo	calized Molecula	ar Orbitals and Ele	ectronic Stru	cture of Buc	kminster	fuller		
56-18			_ œ	emica]	l Phy	sics Lett	ters, Volume 13	2, number 4,5, pp.	383-386	1986)	···			
				"				ires and Spectra of		and Tessels				
- /			l No					2	C COLCUITATE E	/ arti -1008arie	mar 60)		
5610	AS		Te	trahed	dron,	23	6137-6112 (9001	and T-Oxbital Alignment: The Key to the Existence of					
5610	AS		Te Vo	trahed 1.42,	hon, No.	23, pp.			ent: The Key	to the Evis	tence of			
56-1(56-1	AS	-	Te Vo Hæ	trahed 1.42, ddon,	iron, No. et a	23, pp. al., Rehyt	oridization and	ท-Orbital Alignm						
56-1C	A1	-	Te Vo Hæ	trahed 1.42, ddon,	iron, No. et a	23, pp. al., Rehyt	oridization and		Volume 131,					

3.00

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE ATTY, DOCKET NO. 580,246 LIST OF PRIOR ART CHEED BY APPLICANT 7913Z APPLICANT (Upd severy shouts & necessary) Donald R. Huffman, et al. FILING DATE September 10, 1990 U.S. PATENT DOCUMENTS RAMINER DOCUMENT NUMBER INITIAL. HAME CLASS SUDCLASS FILING DATE IF APPROPRIATE ٨A AB AC AD AE AF AG AH Af AJ AK FOREIGN PATENT DOCUMENTS DOCUMENT NUMBER TRANSLATION COUNTRY CLASS SUBCLASS AL AM AH AO AP OTHER PRIOR ART (Including Author, Title, Unic, Pertinent Pages, Etc.) Hess, Jr., et al., The Stability of Footballene, J. Org. Chem, 1986, pp. 3902-3903 561 Rosen, et al., Electronic structure of sphéroidal metal containing carbon shells: study of AS the LaC $_{60}$ and C_{60} clusters and their ions within the local density approximation, Z. Phys. D-Atoms, Molecules and Clusters, pp. 387-390, 1989 DATE CONSIDERED EXAMINER *EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Drow line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

in the second of the second of the second of

Onia P10-14	40	: <u>?</u>						Sheet16	<u>57.</u> or <u>56</u>	5
nev. 7.401	×	COENAR	PATR	DEPARTMENT OF	COMMERCE ARK OFFICE	ATTY, DOCKET NO.		MIAL HO.		
			} 			7913Z	01 J	580, 246	<u> 112: 55</u>	
LIST				BY APPLICAN	IT .	Donald R. Huf:	fman, et a	ı, .		
	(0	se several	sheets if	necessary)		FILING DATE		ROUP	<u> </u>	
					-	September 10,	1990		_	
				U	I.S. PATENT	DOCUMENTS				
HITIAL		DOCUMENT	HUMBER	DATE		HAME	CLASS	SUBCLASS	FILING	PRIATE
	AA									
	AB		TO ELE							
	AC							-		
	AD							-		
	AE		1-1-1		· · · · · · · · · · · · · · · · · · ·			-		
	AF		+ + +							
	AG		1-1-1-						l	
	AH									
	Al									
	AJ		111					-	-	
	AK								-	
	_		LIL	FC	DREIGN PATI	ENT DOCUMENTS		<u> </u>		
		DOCUMENT	нимвеп	DATE		UNTRY	CLASS	SUBCLASS	THANSL	ATION
	AL	TIT	TIT					JOULENS	YES	110
	AM			Process of the						
			111							
	НА								13	
	AO		111						1	0
	AP									
	1		OTHER	R PRIOR ART (In	cluding Authorities	or, Title, Date, Pertiner	nt Pagea, Ele.)			
ار ـ ـ ـ ا	AR	Ha	rter, et	al., Rotation	-vibration	spectra of icosahed	ral molecules	s. I. Icosa	hedral	
50-10		sy	metry a	nalysis and fi	ne structur	e, J. Chem. Phys. 90	O(9), May 198	9, pp. 472	7–4743	
3010		1000				pectra of icosahedra				
26 100 1 1 1	AS									
20/		sy	metry, v	<i>v</i> ibrational ei	gentrequenc	ies, and normal mode	35 OL CUCKIMI	scerniilen	ene,	
70/	АТ			vibrational ei Tys. 90(9), Ma		ies, and normal mode	as of preximit	steriullen	ene,	

*EXAMINER: Initial If reference considered, whether or not citation is in conformance with MPEP 609; Drow line through citation if not in conformance and not considered. Include capy of this form with next communication to applicant.

ONM PTO. NEV. 7.001	رز 1449 این کارک	Ca.	U.S.	DEPARTMENT AND THE	TOF COMMERCE	ATTY, DOCKET HO.		Sheet 17	7 of 5	. 10
		. 9//				7913z		580,246		. 12 : 5
LIŞ	TOF	PRIOR A	RT CITE	BY APPL	ICAHT	Donald R. Huff	man, et	al.		
	((NO HOVER	il sheets i	Luccessary	•)	FILING DATE		GROUP		
						September 10,	1990			
				} 	U.S. PATENT	DOCUMENTS	· · · · · · · · · · · · · · · · · · ·			
EXAMINER		DOCUMEN	T HUMBER	DATE		NAME	CLASS	SUUCLASS	FILIIIO IF APPRO	DATE
	٨٨									
	AB				ļ		1			
	AC									
	AD									
	AE									
	AF	71		1779						
	_	++								
	AG									
	AH								\ <u></u>	
	Af									
	A.J			 	·				<u> </u>	
	 									
	AK			<u></u>					1	
				•	FOREIGN PATE	HT DOCUMENTS				
		DOCUME	IT HUMBER	DATE	co	UNTRY	CLAS	SUBCLASS	TRANSL	ATIOII
				 	·				YES	NO
	AL.				:			1		
				 						
	АМ				· · · · · · · · · · · · · · · · · · ·					
					·					
	АМ									
	АМ									
	AA AH AO		OTHE	R PRIOR AN	T (Including Author	T. Title, Date, Festivent	Pages Etc.			
	AA AH AO					r. Title, Unte, Pertinent				
56-16	AA AH AO	1	ias, A Fa	cile Huckel	l Molecular Orbi	tal Solution of Buck	minsterfu	llene Using C		
56-11	AM AN AO AP	1	ias, A Fa	cile Huckel	l Molecular Orbi		minsterfu	llene Using C		1015
56-11	AM AN AO AP	G	ias, A Fa	cile Huckel cy, Journal	Molecular Orbi	tal Solution of Buck ucation, Vol. 66, No	minsterfu . 12, Dece	llene Using C ember 1989 p	p. 1012-	
56-11	AM AN AO AP	-B	ias, A Fa	cile Huckel ry, Journal et al., Ke	Molecular Orbi	tal Solution of Buck	minsterfu . 12, Dece	llene Using C ember 1989 p	p. 1012-	
56-11	AM AN AO AP	- B	rias, A Farragh Theorems Theor	cile Huckel cy, Journal et al., Ke pp. 55-60	Molecular Orbi of Chemical Ed	tal Solution of Buck Ucation, Vol. 66, No of Footballene, Jou	minsterfu . 12, Dece	llene Using C ember 1989 p	p. 1012—; cture(The	ecchem)
50-11	AM AN AO AP	- B	rias, A Farragh Theorems Theor	cile Huckel cy, Journal et al., Ke pp. 55-60	Molecular Orbi of Chemical Ed	tal Solution of Buck ucation, Vol. 66, No	minsterfu . 12, Dece	llene Using C ember 1989 p	p. 1012—; cture(The	eochem)
	AM AN AO AP AR AS	G H H	ias, A Fa tach Theo rendebbl, 38 (1989) exemt, et	cile Huckel cy, Journal et al., Ke pp. 55-66 al., Inves	Molecular Orbi of Chemical Ed	tal Solution of Buck twation, Vol. 66, No of Footballene, Jour all Carbon Cluster To	minsterfu . 12, Dece	llene Using C ember 1989 p	p. 1012—; cture(The	eochem)
SG-1	AM AN AO AP AR AS	G H H	ias, A Fa tach Theo rendebbl, 38 (1989) exemt, et	cile Huckel cy, Journal et al., Ke pp. 55-66 al., Inves	Molecular Orbi of Chemical Ed ckule Structures chigations of Sm	tal Solution of Buck twation, Vol. 66, No of Footballene, Jour all Carbon Cluster To	minsterfu 12, Deox mal of M ar Structu	Llene Using C ember 1989 p plecular Stru eres by Reect	p. 1012—; cture(The	ecchem)

LIST OF PRIOR ART CITED BY APPLICANT							Sheet 18 ot			
LIS					, DBY APPLIC (neconnary)	CANT	APPLICANT Donald R. Huf:	fman, et		11
							September 10,	1990	anour	
					***************************************	U.S. PATENT		1990	·····	·
EXAMPLER		pocui	HENT P	IUMBER	DATE		NAME	CLASS	SUBCLASS	FILING DATE
	AA	(E)							30000	IF APPROPRIATE
	BA									
	AC						1000			
	AD	Ēij.					1000	11/	7	
	AE									
	AF						· · · · · · · · · · · · · · · · · · ·		,	
	AG									
	AH									
	Al			700					1101	
	AJ									
	AK								i i	
	1				· · · · · · · · · · · · · · · · · · ·	FOREIGN PATE	ENT DOCUMENTS			
		pocu	MENT	HUMBEN	DATE	co	UNTRY	CLASS	SUUCLASS	TRANSLATION YES NO
	AL.	No. of Street		777					477	
	ΛМ			111					ALE I	
	АН									
	AO		11				The state of the s		1 2 1 2	V.
	AP						•			
				OTHE	R PRIOR ART	(Including Auth	or, Title, Date, Pertine	nt Pages, Etc	.)	
	AR		tine	τ απ, et	al., High-M	fass -Carbon Clu	sters from Aramatic	Hydreondo	ne-Observed	by Laser Mass
	_		Spec	tranetr	y, J. Phys.	Chem. 1989, 93	3, pp. 5025-5026			
	AS		Slan	ina, et	al., Quantu	m Chemically S	Apported Vibration a	l Analysis	of Giant Mol	ecules: The
			C 60	and C. 70	Clusters, J	Journal of Mole	cular Structure(The	ochem), 202	(1989), _P	. 169-176
	AT		Same	rville,	et al., An	astronomical o	carch for the molec	ule C _{EO} , Mc	n . Nat. R. e	st. Soc. (1989
			240,	Short	Camunicati c	n, pp. 41p-4 6				
EXAMIN	ER	1		~il	11/		DATE CONSIDERED	//-/	/	

*EXAMINER: Initial II reference considered, whether or not clietion is in conformance with MPEP 609; Drow fine through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

and the second of the second of

USCOMM-0C 80-3885

	4.40				`								Sheet 1		
FORM PTO-1 INEV. 7-801	LIST OF PRIORDART CHED BY APPLICANT (Using several status if nucessary) U.S. PAT								MENCE PFFICE	ATTY. DOCKET HO	•	5 €	580, 246	. 12: 5h	
LIS	TOF	PRI	O ROM	RT	स्री	ED E	у дрр	LICANT	,	APPLICANT		!	110		
	(8	Įše _o s	ever	nl_gt	rylits	il n	CCCSSO	·y-)		Donald R. Hi	uffman, e			••	
		Se Ci	RAD	MAI						September 1	1. 1990	٥	nour		
								U.S. P	ATENT	DOCUMENTS TO	7, 1990			· • · · · · · · · · · · · · · · · · · ·	
MITIAL					MBEI		DATE			HAME	CL/	\$\$	SUBCLASS	FILING IF APPRO	DATE
	AA														
	AB												-		
	AC		W.												-
	AD		A F				•			-					
	AE			H	11	1									
	AF													ļ	
1	AG												1		
	AH														·
	Al		ij.		10			8					,		
	A.J								····						
	AK		_ _		- -	- -									
			1	1 1										1	
	L	l		Ш	لــاــ			FOREIG	H PATE	HT DOCUMENTS					
		50	COME	NT N	OMBE	n	DATE	FOREIG		HT DOCUMENTS	ct	ASS	SUBCLASS	TRANSL	
	AL	50	SOME	NT 11	DMBE	n	DATE	FOREIG			cu	A33	SUUCLASS	TRANSL YES	ATION
	AL AM	bo	CUME	NT N	Омеє	n	DATE	FOREIG			cı	ASS	SUBCLASS		
	-	bo	SUME	NT 11	Owe	n	DATE	FOREIG			cı	ASS	SUBCLASS		
	АМ	bo	суме	, , , , , , , , , , , , , , , , , , ,	Омве	7	DATE	FOREIG			cu	ASS	SUBCLASS		
	МА	bo	CUME	NT N	UMBE	n	DATE	FOREIG			cu	ASS	SUBCLASS		
	AA AH OA	80	соме:	NT N					COL						
	AM AN AO AP	DO			ОТН	ER	PRIOR A	RT (Includi	cot	UNTRY	nent Pages,	E(c.)		YES	
561	AA AH OA	bo	B	alle	OTH ster,	ER I	PRIOR A	RT (Includi	ng Autho	JHTRY or, Title, Unite, Perth	nent Pages, of Interste	E(c.)		YES	
561	AM AN AO AP	000	B	alle	OTH ster,	et hys	al., A	RT (Includit tams in Ca urnal 356	ng Authorition Ca	or, Title, Unite, Perth ges as a Source of 17-512, June 20, 1	nent Pages, of Interste	E(c.)	Diffuse Li	ves	NO
561C	AM AN AO AP	000	B	alle Areas	oth ster, strop	ER I	al., A ical Jo	tans in Caurnal 356	ng Authorarbon Ca pp. 50 nigh mas	ges as a Source of 77-512, June 20, 1 s carbon cluster	of Interste	E(c.)	Diffuse Li	ves	NO
	AM AN AO AP AR		Ba Ti	alle me A	oth ster, strop y, et	er in the state of	al., A ical Jo	tams in Caurnal 356 ation of h	ng Authorition Ca pp. 50 nigh mas	ges as a Source of 7-512, June 20, 1 as carbon cluster 4) February 15, 1	of Interste 1990 ions from 1990, pp. 2	E(c.)	Diffuse Li	ines,	ers an
	AM AN AO AP		B. Ti	alle Areas	othi ster, strop y, et carbo	er in the state of	al., A ical Jo., Formilms, J	tams in Caurnal 356 ation of h	ng Authorarbon Ca pp. 50 nigh mas nys. 92(ges as a Source of 7-512, June 20, 1 as carbon cluster 4) February 15, 1 as from Polymers or	of Interste 1990 ions from 1990, pp. 2	E(c.)	Diffuse Li	ines,	ners an
	AM AN AO AP AR		B. Ti	alle Areas	othi ster, strop y, et carbo	er in the state of	al., A ical Jo., Formilms, J	tams in Caurnal 356 ation of h	ng Authorarbon Ca pp. 50 nigh mas nys. 92(ges as a Source of 7-512, June 20, 1 as carbon cluster 4) February 15, 1	nent Pages. of Interste 1990 ions from 1990, pp. 2	E(c.)	Diffuse Li	ines,	ers an

IREY. 7-801	1449		U.S. DEPARTMEN	IT OF COMMERCE	ATTY, DOCKET HD.		Sheel 2	J 61	96
			8		7913z		580,246	12: 54	
LIS	TOF	PRIOR ART CI	TED BY APPL	ICANT	APPLICANT		7 1 3 1 1	, 1	
	(U	na noveral shee	eta if necessary	•)	Donald R. Huf	fman, et	al.	·	
			r - 1		September 10,	1990			
				U.S. PATENT	DOCUMENTS				
HITIAL		DOCUMENT NUME	SER DATE	1	HAME	CLASS	SUBCLASS	FILIIIG IF APPRO	DATE
	AA								
	AB								
	AC								·····
	AD								
	AE								
	AF								
	AG	-							
	AH								7
	AI						April 1991	lo I	
	A.J	Ŧ			-1			1	
	AK								
	<u></u>			FOREIGH PATI	ENT DOCUMENTS			1	
		DOCUMENT NUM	BER DATE	co	UNTRY .	CLAS	SUBCLASS	TRANSL	ATION
								YES	110
	AL	ПП	i Pri de la companya da la companya						
	AL								
	AL			16, 53					
	-								
	АМ								
	МА НА								
	AM AH AO		THER PRIOR AT	RT (Including Auth	or, Title, Unto, Perline	nt Pages, Et	z.)		
	AM AN AO AP			·		 -		Cage,	
46-K	AM AN AO AP	Fowler	, et al., Elec	tric and Magnet	ic Properties of th	e Aramatic	Sixty-Carbon	Cage,	
50-K	AM AN AO AP	Fowler Chemic	, et al., Elec	tric and Magnet	ic Properties of th	e Aromatic y 5, 1990,	Sixty-Carbon pp. 79–86		
50-K	AM AN AO AP	Fowler Chemic Ceulem	, et al., Elecal Hysics Let	tric and Magnet ters, Volume 16 he Jahn-Teller	ic Properties of the 5, number 1, Januar instability of five	e Arcmatic y 5, 1990, fold degene	Sixty-Carbon pp. 79–86		echral
50-K	AM AN AO AP AR	Fowler Chemica Caulem Tolecu	et al., Elected through the second se	tric and Magnet ters, Volume 16 he Jahn-Teller Phys. 93(2), Ju	ic Properties of th 5, number 1, Januar instability of five ly 15, 1990, pp. 12	e Arcmatic y 5, 1990, fold degene 21-1234	Sixty-Carton pp. 79–86 rate states	in icosah	
56-K 56-K	AM AN AO AP	Fowler Chemics Caulem molecui Haddon	et al., Electrical Hysics Lettrans, et al., Them.	tric and Magnet ters, Volume 16 he Jahn-Teller Phys. 93(2), Ju ahedral C ₆₀ Rev	ic Properties of the 5, number 1, Januar instability of five ly 15, 1990, pp. 12 isited: An Arometic	e Arcmatic y 5, 1990, fold degene 21-1234 Molecule w	Sixty-Carbon pp. 79-86 rate states ith a Vanish	in icosah ingly Sπa	11
56-K 56-K 56-K	AM AN AO AP AR AS	Fowler Chemics Caulem molecui Haddon	et al., Electrical Hysics Lettrans, et al., Them.	tric and Magnet ters, Volume 16 he Jahn-Teller Phys. 93(2), Ju ahedral C ₆₀ Rev	ic Properties of th 5, number 1, Januar instability of five ly 15, 1990, pp. 12	e Archatic y 5, 1990, fold degene 21—1234 Molecule w	Sixty-Carbon pp. 79-86 rate states ith a Vanish	in icosah ingly Sma 4, June :	11

nev. 7.40	1449	154	, 19	O PAIR	DEPARTMEN	TOF COMMERCE	ATTY. OOCKET NO.		Sheet 21 SERIAL IIO. 580,246	12: 55	
		. //s		· · · · · · · · · · · · · · · · · · ·	BY APPLI		7913Z	`			
LIS	I UF	PKIO	REAR	CLIE	FBY APPLI Encossory)	CAHT	Donald R. Hut	ffman, et	al.		
	10	ac ac	rerar :	sneers 1	i necossary)		FILING DATE		anour		
							September 10	, 1990			
EXAMINER	 -					U.S. PATENT	DOCUMENTS				
HITIAL		pocu	MENT I	NUMBER	DATE		NAME	CLASS	SURCLASS	FILING IF APPRO	PRIATE
	AA										
	AB								4		
-	AC							71 7.5			
	AD										
	AE										
	AF										
	AG										
	АН					· · · · · · · · · · · · · · · · · · ·					
	Al										***************************************
	LΑ		\prod								
	AK										
			JI	.tl.,	<u> </u>	FOREIGH PATI	ENT DOCUMENTS				
	100	DOC	MEHT	HUMBER	DATE	Co	UNTRY	GLAS	SUBCLASS	TRANSL	ATION
	AL		TT	TIT	 					765	НО
	AM		+	111		T				-	
	АН		++								ļ
	AO	-	+								-
	-				 				10		
	AP				<u> </u>					<u> </u>	
	1						or, Tille, Unte, Perlind				
501	AR		Jak	olin, et	al., Detec	ction of diffus	e interstellar band	ds in the in	frared, Natur	æ,	
1011	-		Vo]	1. 346,	August 23,	1990, pp. 729-	731				
	AS		Ami	e, et e	l., On the	Lack of Reacti	vity of Budminster	fullerene:	A Theoretical	Studyr	
			J.	Chem. E	cc. Perkin	Trans., 1990,	. 1595-1598-				
60			Har	ano, et	al., Decor	position of ga	seous hydrocarbons	in a laser	induced plasm	na as a m	ovel
501	TA P		car	tonacec	us source f	or cluster fon	mation, Chemical Pr	ysics Lette	rs, volume 17	2, numbe	r 3,4
EXAMIN	ER	<u> </u>	//	/	1 N		DATE CONSIDERE	0 /	, 1990, pp. 2	19-223	
EVAMIN								1/17/			

a Maria de Cara de Maria de The state of the s

Onia P10-14	149	SS	5	DEPARTMENT NT AND TRAC	OF COMMENCE	7913Z	3	Sheet 22 ERIAL IIO. 580, 246		
LIST	r or	PRÍOR AR	T GITED	BY APPLIC	CANT	Donald R. Hu		al.		2: C.
		A CHILL	2			September 10		onour		
					U.S. PATENT		·			
XAMINER		DOCUMENT	HUMBER	DATE		HAME	CLASS	SURCLASS	FILING	DATE
	^^									
	AB									
	AC		111			parameter.			8	
	AD						177		1	
	VE									
	AF				•		=0			
	AG									
	НА									
	Al									
	A.J						1			
	AK									
					FOREIGN PAT	ENT DOCUMENTS				
		DOCUMEN	r HUMBER	DATE	C	PHTHY	CLASS	SUBCLAS	S TRANSL	A TIDH NO
	AL									
	АМ									
	AH								1	
		1								
	AO	L. J. F. F.	4 4 4		•			1		-
	AO									
	1-		01111	ER PRIOR AR	T (Including Aut	tor, Title, Vote, Perlina	nt Pages, Etc	:.)		-
- 16	AP	Ya				on Clusters: Chains			nysics Let	ters,
561	1-		ng, et a	l., Ups of		on Clusters: Chains			nysics Let	ters,
561	AP	Vo Ro	ng, et a	ul., Ups of l, number 5,	2-30-Atom Carb 6, pp. 431-436	on Clusters: Chains	and Rings,	Chemical P		
56 K	AP	Vo Ro	ng, et a dume 144 een, et	ol., Ups of 1, number 5, al., First-	2-30-Atom Carb 6, pp. 431-436 Principle Calo	on Clusters: Chains	and Rings,	Chemical P	Electron A	
	AP	Vo Ro of	ng, et a dume 144 sen, et the Sph	ol., Ups of l, number 5, al., First— peroidal Mol	2–30-Atom Carb 6, pp. 431–436 Principle Calc ecules C ₆₀ and	on Clusters: Chains $3/11/88$	zation Pote Soc., 1988	Chemical Pi	Electron <i>A</i> 8701—8703	Affini
561 561 501(AP	Vo Ro Of Bro	ng, et a dume 144 een, et the Spr endedal,	ol., Ups of l, number 5, al., First— peroidal Mol	2-30-Atom Carb 6, pp. 431-436 Principle Calc ecules C ₆₀ and mal Coordinat	on Clusters: Chains 3/11/88 ulations of the Ioni LeC ₆₀ , J. Am. Chem.	zation Pote Soc., 1988	Chemical Pi	Electron <i>A</i> 8701—8703	Affini
	AP AR AS	Vo Ro Of Bro	ng, et a dume 144 een, et the Spr endedal,	ol., Ups of I, number 5, al., First- mercidal Mol et al., No	2-30-Atom Carb 6, pp. 431-436 Principle Calc ecules C ₆₀ and mal Coordinat	on Clusters: Chains 3/11/88 ulations of the Ioni LeC ₆₀ , J. Am. Chem.	zation Pote Soc., 1988 mallene" C	Chemical Pi	Electron <i>A</i> 8701—8703	Affini

La Maria Salar Cara Maria

9770

MIA PTO+1	419	19	92		DEPARTMENT NT AND THAC	OF COMMERCE ORMANN OFFICE	7913Z		SERIAL HO.	56 56
LIS	T OF T	R (0)	ower a	ČITED reets it	BY APPLI	CANT	Donald R. Huf			
					·	U.S. PATERT	September 10,	1990		
AMIHER			MENT H			0.3, 17, 18111	-			F
TIAL	_	1	MENT N	MBEH	DATE		HAME	CLASS	SURCLASS	FILING DAT
	^^									
	AB			4 80				4		
	AC									
	AD				- 1		·			
	AE									
	AF	\dashv		- - -		•				
	AG	-	++1	-						·
	AH	-	+							
	 	i da		-	====					
	A1	_			1					
	AJ									
	AK									
						FOREIGH PAT	ENT DOCUMENTS		······································	
	F F	DOC	UMENT	нчмвеп	DATE	С	OUNTRY	CLAS	SUBCLAS	TRANSLATIO
	AL									
	АМ		11					-		
	AN		11		-					
	AO	$\left - \right $		Pick	4					1
	-		- -							
	AP			للل		1				
			Droop				her, Title, Date, Pertir			
501	AR						blecular Vibrations	or "rootba	Itene 60'	Spectroscopy
	-		Lette	ers, 21	(4), 1988,	pp. 319–339				
	AS						onjugated Organie N			-
	-		Chara 1127	eteriz pp. 33	ed Molecule 95-3399	Displays the	Highest Degree of I	yramidaliza	tion?, J. Am.	Chem. Soc.,
	АТ					rs: A Class c	f Closed shell Clus	ters, J. Ci	em. Soc. Para	day Trans. 19
	1 ^'		86(2	***************************************			·			· · · · · · · · · · · · · · · · · · ·

*EXAMINER: Initial if reference considered, whether or not citatian is in conformance with MPEP 609; Drow fine through citation if not

in conformance and not considered. Include copy of this form with next communication to applicant.

Land Berger Berger

Contract of the PND to the second

Sheet 24 of 56 FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE ATTY. DOCKET HO. SEMIAL HO. 580, 246 1112: 54 7913Z LIST OF PRIOR ART CITED BY APPLICANT APPLICANT Donald R. Huffman, et al. (Una souteral shouts if necessary) FILING DATE ghour September 10, 1990 U.S. PATERT DOCUMENTS EXAMINER DOCUMENT HUMBER FILING DATE DATE HAME CLASS SUDCLASS 88 ΑB AC ٨D AE AF AG AH Af AJ AK FOREIGH PATENT DOCUMENTS DOCUMENT HUMBER TRANSLATION DATE COUNTRY CLASS SUBCLASS YES AL AM HA ۸o AP OTHER PRIOR ART (Including Author, Title, Date, Perlingut Pages, Etc.) diarg, et al., Stability and reactivities based on moment analysis, Theor-Chim Actra-AR (1989) 75: pp. 279-297 Ceulemens, et al., SO(4) symmetry and the static Jahn-Teller effect in icosahedral A5 molecules, Physical Review A, Volume 39, Number 2, January 15, 1989, pp. 481-493

*EXAMINER: Initial II reference considered, whether or not citation to in conformance with MPEP 609; Diaw line through citation II not in conformance and not considered. Include copy of this form with next communication to applicant.

EXAMINER

The State of the Control of the Control of

21700

Rosen, et al., Calculations of the ionization thresholds and electron affinities of the

neutral, positely and negatively charged C_{60} "follene-60", J. Chem. Phys. 90(4), February 15,

DATE CONSIDERED

1989, pp. 2525-2526

INEV. 7.401	LIST OF PRIOR ART CITED BY APPLICANT (Una several sheets if necessary) U.S. PATI							7913Z APPLICANT Donald R. Huffr FILING DATE September 10,	man, et al	1.580 ₇ ,246		
							U.S. PATENT	DOCUMENTS	——————————————————————————————————————		-	
EXAMINEN INITIAL		pocu	MEHT	нимв	en	DATE		HAME	CLASS	SUBCLASS	FILING	DATE
	۸۸	_ _										
	AB											
	AC			11								
	AD				11					U.		1
	AE											
	AF					•	·					
	AG			14								
	АН											
	Al											
	A)				i		America and a second					
	AK											
							FOREIGH PAT	ENT DOCUMENTS				
	A 1	000	UMEH	T HUN	HBER	DATE	C	שאדתי	CLASS	SUBCLAS	THANSL	ATION
	٨L		11		Ш			_				
	АМ				11						L.	
	АН								V2-7-			
	AO									=7	All	
	AP											
ļ		1 1						ior, Title, Date, Perlina				
1	AR							ty Researing for Cl				An
			.11	lusta	satic	n with th	r Co C /O Systa	n, Thermochimica Act	a, 140 (1989) gp. 07-9	5-	
1 = 61	As		Са	mpbe]	11, e	et al., An	intense, simple	e carbon cluster sou	iroe, J. Chem	n. Phys. 93(9), Novem	ber 1,
561	1990, pp. 6900-6907											
- I	AT		Ro	hlfir	ng, e	et al., Tw	o-color pyraneti	ric imaging of laser	-heated cart	on particle	sina	
15611	"		su	pers	mic	flow, Che	mical Physics Le	etters, volume 170,	number 1, Ju	ne 29, 1990	, pp. 44	-50
EXAMI	IED	-						DATE CONSIDERE				

n de 1840 de jaron de la Carlon de la Carlon

nev. 7.401	449	11.1 1000	2	\$	V.S. (HENT THE	TOF COMMETICE	ATTY. DOCKET NO.		Sheet <u>26</u> 580,246	/ 110. 5	
		٠	~~ VB 18	//				7913Z)
Lis	TOF	RIOI	R=AR	T CIT	TED	BY APPLI	CANT	Donald R. Huffma		,		
	(U	וטא או	reral	shea	ts if	песоявиту		PILING DATE	an, et a	Gnoue	·· · ·	
						•		September 10, 19				
							U.S. PATENT					
EXAMILER HITIAL		pocui	THBP	нимв	EN	DATE		HAME	CLASS	SUBCLASS	FILING IF APPROI	DATE
	۸۸							·				
	AB	-										
	ΑC											
	AD					•		•	_		<u> </u>	
	ΑE	1		+-					_			
	AF			11	-		•		_		<u> </u>	
	AG			1-1	1							
	АН	+	11	11	_							
	AI											
	A.J								_			
	AK		1									
			L			<u> </u>	FOREIGH PAT	ENT DOCUMENTS				
		poc	JMENT	r HUM	1981	DATE	C	DUNTHY	CLAS	SUBCLASS	THANSL	ATION
	AL		11								1 .63	
	АМ										1	
	АН		11			-						
	٨٥										-	
	AP					-		•				-
		·			THE	R PRIOR AI	RT (Including Aut	hor, Title, Date, Perlings	t Pages, El	l c.)		J
			Ha	le, D	Di.scr	ete-Variat	ional-X alcha	Electronic Structure	Studies of	the Schemic	al C Cl	uster.
561	AR		Pre	edict	ian	of Ionizat 087–6088	ion Potential	and Electronic Transi	tion Freq	y, J. Am. On	em. 500.	1986,
							Structure of the	he Truncated—Icosahed	ral C. Cl	uster.		
5011	AS							O, number 6, October	~		-	
<u> </u>			Rak	oiliz	ziro	, The Role	of Cavities a	nd Mantles in the Ult	raviolet E	xtinction Pe		phite
561	AT							o a Possibly Discover (1986), pp. 331—339	ed C ₆₀ St	ructure,		
EXAMIN	ER											
LEVVIN	CH	1		1	-	hall		DATE CONSIDERED	/17/	/		

*EXAMINER: Initial II reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation il not in conformance and not considered. Include capy of this form with next communication to applicant.

200

roms PTO-1449

								7913Z			580, 246	112: 55	
LIST OF PRIOR ART CITED BY APPLICANT (Use several shouts if necessory)								Donald R	. Huffmar				
	(0.	NO 801	'eral .	shcef.	7 if i	иссеязату)		FILING DATE		01	iour		
								Septembe	r 10, 199	90			
							U.S. PATE	HT DOCUMENTS		***************************************			
NAMIHER HTIAL		pocu	4ENT	HUMBE	n	DATE		HAHE		CLASS	SUDCLASS	FILING I	DATE
	۸۸												
	AB AC												
	ΛC												
	AD												
	AE												
	AF	_		11			•						· · · · · · · · · · · · · · · · · · ·
	AG					·· · ·································				,			
	AH		1-1-	_ _									
	AI			$\perp \downarrow$			·			ļ			
	Y1												
	AK												
	1						FOREIGH	TATENT DOCUME	HTS				
		poc	UMENT	HUM	PER	DATE		COUNTRY		CLASS	SUBCLAS	YES	HO
	AL												
	АМ												
	AH												
, 	AO									·			
	AP		Ш]	<u> </u>						
				0	THE	R PRIOR A	RT (Including	Author, Title, Date	r, Perlinani I	'adea, Ele.)	· · · · · · · · · · · · · · · · · · ·	
56-10 56-10	AR		x	et	al.,	C ₆₀ La:	A Deflated S	Soccer Ball?, J.	Am. Chem.	Scc. 1986	, 108, pp.	2457-2458	3
	AS		Dis	xh, ∈	t al	L., On Sym	metrical Clu	sters of Carbon	Atans: C ₆₀	, Chemica	1 Physics	Letters,	
5610								1996, pp. 465-					
5-1	A		Fow	ler,	et a	al., 11 -sy:	stems in Thr	ree Dimensions, (Chemical Ph	ysics Let	ters, Volu	me 127, nu	nber
20-1	/		May	30,	1986	5, pp. 78	-83						
EXAM			//	//	-	1 11		DATE COL	ISIDERED				

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Drow line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Land Marine State Control of Marine

oma P10-1		192 \$11				11 11 11 11	[11 2 2 9]	Sheet28	or56	5	
nev. 1.401		CIT THINKS	PATRA	AND THA	TOF COMMERCE	ATTY. BOCKET NO.	Divio				
1 10		PRIOR ART	CITEN	av inni	15.117	7913Z	11112: 55	580,246			
LIS		rkiok aki so soveral s				Donald R. Huffm	man, et al	•			
			arcers ()	necessary	,	September 10, 1990					
					U.S. PATENT	DOCUMENTS			-		
NJHIMAKE JAITIN		DOCUMENT N	UMBER	DATE		HAME	CLASS	SURCLASS	FILING IF APPROP	DATE	
	۸۸										
	AB										
	AC							-			
	AD										
	ΑE										
	AF							_			
	AG							-	ļ 		
	AH				 	· · · · · · · · · · · · · · · · · · ·					
	AL								1<		
	AJ								-		
	AK	FIT	\Box		1		_	1			
			1_1_1_	L	FOREIGH PAT	ENT DOCUMENTS			1		
		DOCUMENT	HUMBER	DATE	CC	אינים	CLASS	SUBCLASS	TRANSL	11011	
	AL	TIT	TTT		-				YES	110	
	-	+++		1000							
	AM	- - -		-							
	AH										
	AO		+								
 	AP				<u> </u>				<u> </u>		
						or, Title, Date, Perting					
-11	AR	Ozak	i, et al	l., On Ele	ctronic States	and Bond Lengths of	the Truncate	d Icosahedr	al C		
561		Mole	cule, C	nemical Ph	ysics Letters,	Volume 127, number 3	, June 13, 1	986, pp. 24	2-244		
111	AS	Newt	on, et a	al., Stabi	lity of Buckmin	sterfullerene and Re	lated Carbon	Clusters,	J. Am. Ch	em.	
100	^,			108, pp. :							
		Hadd	bn, et a	al., Electr	ronic Structure	and Bonding in Icos	ahedral C	Chemical P	rvsics [e	ttere	
500	AT				5, April 18, 190				-,		
EXAMI	ER	11/1	. ,	111		DATE CONSIDERED	2/1				
	5	Pola	rely	10		8	117/	92			
.EXYW	NER:	Initial II rofe	renco cor	nsidered, wi	nether or not citati	an te In conformance wi	1h MPEP 609;	Drow line thro	ough ellotla	n If no	

In conformance and not considered. Include copy of this form with next communication to applicant.

The Section of the Control of the Co

			7 A	1879	£#			•	Sheet 29	at 56	5
1.1S			R AR	AND I	BY APPL	T OF COMMETICE DRMANK OFFICE	ATTY. BOCKET HO. 7913Z		Sheel <u>29</u> SERIAL NO. 1 580,246	.112: 55	
					l necossary,		Donald R. Huff	man, et a	al.		
							September 10,		gnoup '''	- - . •	
						U.S. PATERT	· · · · · · · · · · · · · · · · · · ·				
EXAMINEN		poci	MEHT	илмвеи	DATE		HAME		SUBCLASS	SS FILING DATE	
	44										
	AB										
	AC			Ш							
	AD										
	AE										
	AF										
	AG										
	АН										
	AI	= 1									
	AJ										
	AK		11	111							
						FOREIGH PAT	ENT DOCUMENTS	mb			
		000	CUMENT	HUMBER	DATE	C	OUIITNY	CLAS	S SUBCLAS	THANSLA	11011
	AL										
	АМ										
	AH										
	AO										
	AP										
		1		OTIII	ER PRIOR A	RT (Including Aut	ior, Tille, Onte, Peilla	ent Pages, B	(c.)		·
561	- AR						Prediction for the	Stable, Tru	ncated Icosal	nedral	
	117	E		•••			, 108, pp. 319–321	2			
5616	_ As		1				lids Constructed fr			n Atoms,	
							, number 5, December "unidentified IR ea			ersteller a	
500	^1					7, (1986), pp. 1					
	· c n	1									

*EXAMINER: Initial II reference considered, whether or not citation is in conformance with MPEP 609; Drow line through citation II not in conformance and not considered. Include copy of this form with next communication to applicant.

LIST OF PRIOR ART CITED BY APPLICANT (Unit 100 section in the construction of commence of the construction of the constructio							HT OF COMME	RCE	X						
	,	1	چ© QQn	ar l)				7913Z			580,246	್ತು ಕನ		
LIST	OF!	មុំស្គាប់	RAKR	T GIA	ED	BY APP	LICANT		Donald R. H	luffmar	ل الله	7	1. 30		
	(U)	HO HE	ggtál	Micul	s ii	Hecosso	ry·)		rilling DATE	iurriiai		nour .	. , ,		
									September 10, 1990						
							U.S. PA	TEHT	т росиментѕ						
TIAL TIAL	_	000	MEUT	HUMBI	En	DATE			HAME		CLASS	SUDCLASS	FILING IF APPRO	DONATE	
	^^					· · ·									
	АВ									ŀ					
	AC														
	AD				П				•						
	ΑE		11	11	1										
	AF		\prod												
	AG						·				,				
	АН												\ <u> </u>		
	Al														
	ΑJ		11		1			····							
	AK		11	11	-								-		
	AK						FOREIG	H PAT	ENT DOCUMENTS						
	AK	00	CUMEN	T HUM	een .	DATE			EHT DOCUMENTS		CLASS	SUBCLASS		LATION	
	AK	bo	CUMEN	T NUM	9EN	DATE					CLASS	SUBCLASS	T T A H S		
		bo	SUMEN	T NUM	BEN	DATE					CLASS	SUBCLASS			
	AL		CUMEN	T NUM	BEN	DATE					CLASS	SU BCL AS			
	AL		CUMEN	T NUM	980	DATE					CLASS	SU BCL AS		HO	
	AL AM		CUMEN	T NUM	980	DATE					CLASS	SU BCL AS			
	AL AM AH		CUMEN					CC		Minant P					
C/_ (AL AM AH			0	TITE	R PRIOR	ART (Includi	CC	PATRIC	The state of the s	nges, Bic	.,	VE3	HO	
56-1	AL AM AN AO AP		Sta	o	Tile ich,	R FRIOR	ART (Includion The Structu	ng Audi	OUNTRY	talline	orien, Etc Carbon:	Geometry,	VE3	HO	
50-1	AL AM AN AO AP		Stan	o enkev	Till E	et al.,	The Structu	ng Audu uxal Clean Che	nor, Title, Vale, Per hemistry of Cryst	talline 3(7), 19	Carbon:	Geometry, 640-655	Stabilit	iio	
50-K	AL AM AN AO AP		Stan	o enkev	Till E	et al.,	The Structu	ng Audu uxal Clean Che	hemistry of Cryst	talline 3(7), 19	Carbon:	Geometry, 640-655	Stabilit	iio	
50-1	AL AM AN AO AP		St:	o ankev d Elec	Tille ich, otror	et al., nic Spec	The Structu trum, Russia ance in C	and Audionaria Chean Che	hemistry of Cryst	talline 3(7), 19 J. Am.	Carbon: 384, pp.	Geometry, 640-655 cc. 1986, 10	Stabilit	1301-1:	
50 K 50 K 50 K	AL AM AN AO AP		St. an Klo	o ankevid Elecin, e	ich, ctro	et al., nic Spec	The Structu trum, Russia ance in C	and Audionated Chemical Chemic	hemistry of Cryst mical Reviews, 53 insterfullerene,	talline 3(7), 19 J. Am.	Carbon: 384, pp.	Geometry, 640-655 cc. 1986, 10	Stabilit	1301-13	
56-1(56-1(56-1(AL AM AH AO AP		St. an Klo	o o ankevid Elecin, e	ich, ctro	et al., nic Spec	The Structutrum, Russia ance in C ₆₀	and Audionated Chemical Chemic	hemistry of Cryst mical Reviews, 53 insterfullerene,	talline 3(7), 19 J. Am.	Carbon: 384, pp.	Geometry, 640-655 cc. 1986, 10	Stabilit	1301-1:	

 $x \sim 23 \omega + m_{\rm p} = 6 \omega + m_{\rm p} = 0$

Section 1. Section 1. Section 1. Section 1. Section 1.

LIST		26 1992 MLORAN	Ber Citet Il sheets i	DEPARTMENT OF CONTAMENT OF CONT	COMMETCE IN OFFICE	Sheet 31 of 56 ATTY. DOCKET HO. 7913Z APPLICANT Donald R. Huffman, et al. FILING DATE GROUP							
						September 10, 1990							
				U.	S. PATENT	DOCUMENTS							
TIAL			T NUMBER	DATE		HAME	CLASS	SUNCLASS	FILING DATE				
	^^												
	АВ												
	AC												
	AD												
	AE												
	AF												
	AG												
	AH						r						
	<u> </u>		\square										
	A.J	_ _ _			·								
	AK							1					
				FO	REIGH PAT	ENT DOCUMENTS							
		DOCUME	HT HUMBER	DATE	co	YNTHUC	CLAS	SUBCLAS!	TRANSL	HOITA			
	AL									\ <u> </u>			
l l	АМ) d										
	^~												
	АН												
	НА												
	AH AO		OTHE	ER PRIOR ART (In	ciuding Anti	ior, Thie, Date, Perling	ul Pages, Et	c.)					
	AH AO AP			·		ior, Tille, Date, Perlina igation of Bedminst			l Carbon G	luste			
	AH AO	(ng, et al	, Quantum chemic	cal Invest	igation of Budminot	erfullerene eterfuller	and Related					
	AH AO AP	(ng, et al	, Quantum chemic	cal Invest		erfullerene eterfuller	and Related					
	AH AO AP	f:	ng, et al	, Quantum chemic dectronic Struct al Journal of Q	cal Invest ture and U wantum Cha	igation of Budminot	erfullerene eterfullere 1990, pp	e and Related ne, and othe 509-607	er Coo Coo	1 0 5,-			
5 GK	AH AO AP	E C	ing, et al I): The E Thematic Teasy,	, Quantum chemic dectronic Struct al Journal of Q	ture and U ture and U uantum Char calculatio	igation of Budminst V Spectra of Budmin mistry, Vol. XXVVII, ons of carbon cluste	erfullerene eterfullere 1990, pp	e and Related ne, and othe 509-607	er Coo Coo	186 7-			
5 GK	AH AO AP AR	92 E±	resy, ct al	Juntum chemic dectronic Stract al Journal of Q Some model ne 15, 1990, pp.	ture and Union turn Chor calculation 7223–7233	igation of Budminst V Spectra of Budmin mistry, Vol. XXVVII, ons of carbon cluste	erfullerene sterfullere 1990, pp er growth ki	e and Related ne, and othe 509-607 netics, J. C	hem. Phys	1 0 5,-			
SCK	AH AO AP	(t) If O O O E	reasy, 2(12), June 1	Journal chemic Structural of Q Some model ie 15, 1990, pp.	ture and U wontum Char calculation 7223-7233 the UV Spa	igation of Budwinst V Spectra of Budwin wistry, Vol. XXXVII, ons of carbon cluste	erfullerence sterfullere 1990, pp. er growth ki	e and Related ne, and othe 509-607 netics, J. C	hem. Phys	1 0 5,-			
SCK	AH AO AP AR AS	(t) If O O O E	reasy, 2(12), June 1	Journal chemic Structural of Q Some model ie 15, 1990, pp.	ture and U wontum Char calculation 7223-7233 the UV Spa	igation of Budwinst V Spectra of Budwinst Wistry, Vol. XXXVII, ons of carbon cluste ectrum of the Trunca em), 183, 1989, pp.	erfullerene isterfullere 1990, pp. er growth ki	and Related re, and othe 509-607 netics, J. (dral C ₆₀ Mol	hem. Phys	186 7-			

8 (V 13)

PTO-1.	T OF I	ol Prior	101V 26 " 992 ART CI	TED B	PARTMENT TANG THAG BY APPLIC	OF COMMERCE RMARH OFFICE ANT	ATTY. DOCKET HO. 7913Z APPLICANT Donald R. Huffman, et al. FILING DATE September 10, 1990						
						U.S. PATEHT	·		L				
CAMINER		DOCUME	BMUH TH	En	DATE	NAME CLASS			SUBCLASS FILING DAT				
	AA									IF APPROPR	IATE		
				- - -						-			
	AC			+						-			
									_	<u> </u>			
	AD	-	+++	+									
			+++	\dashv									
	AF			- - -	·	•				_			
	AG		-				· · · · · · · · · · · · · · · · · · ·	<u> </u>					
	AH		- - -	-						1			
	A1												
	Y)												
	AK												
	_						EHT DOCUMENTS						
		BOCUL	MENT HUM	4067	DATE	C	YNTHUC	CLA	SS SUUCLAS	THANSLAT	1011		
	AL							A. L.					
	АМ												
	AH			1 1 1									
	AH												
	3												
	AO			THER	PRIOR AR	T (Including Auti	ior, Title, Date, Pertie	ient Pages, E	(c.)				
	AO									ers,			
50-(AO		Wu, et a	al., \	/ibrational		uckninsterfullerene			ers,			
50-(AO AP		Wu, et a	al., V	/ibrational number 3, 3	l Motions of B June 12, 1987,	uckminsterfullerene pp. 291–294	, Chemical	Physics Lett				
56K	AO		Wu, et a	al., V 137, r e, An	/ibrational number 3, 3 Experiment	l Motions of B June 12, 1987, al Study of th	uckminsterfullerene pp. 291—294 ne Dust of Iron, CA	, Chemical	Physics Lett				
56K	AO AP		Wu, et a Volume : Lefevre	al., \ 137, r e, An	/ibrational number 3, 3 Experiment trophys. V	Motions of B June 12, 1987, al Study of the Johns 5, No. 1	pp. 291—294 ne Dust of Iron, CA	rbon, Silio	Physics Lett	nd Silica,			
56K 56K	AO AP		Volume : Lefevre Astron. Kroto,	al., \ 137, r e, An . & As et al	vibrational number 3, 3 Experiment trophys. V ., The for	Motions of B June 12, 1987, al Study of the Johns 5, No. 1	pp. 291—294 The Dust of Iron, CA 1, 1970 pp. 37-44 Si-ioosahedral spira	rbon, Silio	Physics Lett	nd Silica,			
50-1 50-1 50-10	AO AP AR AS		Volume : Lefevre Astron. Kroto,	al., \ 137, r e, An . & As et al	vibrational number 3, 3 Experiment trophys. V ., The for	Motions of B June 12, 1987, al Study of the Johns 5, No. 1	pp. 291—294 The Dust of Iron, CA 1, 1970 pp. 37-44 Si-ioosahedral spira	chemical	Physics Lett	nd Silica,			

MA CONTRACTOR CONTRACTOR

The second of th

onia PTO-1	440		92						- Sheet: <u>" (3</u> 3	56 <u>56</u>			
E V. 7.801	. 1	<u>م</u> کا	63	U.S. DE	T AND THACK	COMMERCE ANH OFFICE	ATTY. DOCKET NO.		- Sheet: 133.27 6 56 SERIAL IIO. 				
		TRAI	DEMARIA	4	BY APPLICAN		7913Z , (5807,246) (5807,246)						
Lis						IT	Donald R. Huf	fman ot	21	· · ·			
	(U)	to Rove	ral shed	ets if n	іссеявиці)		FILINO OATE	Lindii, et	onour				
							September 10, 1990						
					U	J.S. PATENT	DOCUMENTS						
NAMIHER		DOCUME	HT HUME	BER	DATE		HAME		SUBCLASS	FILINO DATE			
	۸۸												
	AB			_ _									
	AC		111						_				
	AD			+					-				
	ΛE			++									
	AF			+			•						
	AG	-								1			
	AH							<u> </u>		-			
	AL		$\pm \pm \pm$										
· ·.	Y J	-	_ _	- -									
	AK			Ш									
					F	OREIGH PAT	ENT DOCUMENTS						
<u></u>		DOCUM	IEHT HUR	MBEN	DATE	C	OUIITRY	CLA	SS SUBCLAS	YES N			
	AL												
	АМ												
	AH								1				
	AO												
	AP												
				THER	PRIOR ART (Including Auti	ior, Tille, Date, Pettin	ant Pagas, S	(c.)				
2.1	AR		Gerhard	Jt, et	al., Polyhed	Bral Carbon	Ions in Hydrocarbon	Flames, O	nemical Physi	cs Letters,			
561					number 4, Jur								
011	1						lerene and Other La	rae Cluste	as of Carton	Chemical			
0-1	AS	1 1			•		3,4, August 28, 198			- Millian			
		4 1								55			
	AT	-	VIICON	OL.7	LACITACION N	vicii sorveni	s, Experimetral Ocq	aruc Chemis	stry, pp. 79-	₩			
		4 1											
EXAMI	IER	1.1	-1/	1	1 11		DATE CONSIDERE	D					
EXAMI	IER	1.1	4/1	1	full		DATE CONSIDERE	8/17	192				

Control of the Control of the Park Day

Serial No. 56 580, 246 2: 57 U.S. DEPARTMENT OF COMMERCE PATENT AND THADRMANK OFFICE ATTY, DOCKET HO. 7913Z Donald R. Huffman, et al. (Una noveral allents if necosanty) FILING DATE gnour September 10, 1990 U.S. PATENT DOCUMENTS EXAMINED INTER DOCUMENT HUMBER DATE HAME CLASS FILING DATE SURCLASS AA AB AC AD ΑE AG AH Al AJ FOREIGN PATENT DOCUMENTS DOCUMENT HUMBER DATE TRANSLATION COUNTRY SUBCLASS YES AL. AM AH AO AP OTHER PRIOR ART (Including Author, Title, Date, Pertinent Pages, Ele.) Kroto, Space, Stars, Co, and Scot, Science, November 25, 1988, pp. 1139-1115 Kroto, Giant fullerenes, Chemistry in Britain, January 1990, pp. 40-45 Pussoletti, et al., Experientos on Coemic Dust Analogues, Volume 149 Proceedings, pp. 25-42 AT EXAMINER DATE CONSIDERED *EXAMINER: Initial II reference considered, whether or not cliniton is in conformance with MPEP 609; Drow line through citation II not

in conformance and not considered. Include copy of this form with next communication to applicant.

and the state of t

.. sheet. 35 of 56 U.S. DEPARTMENT OF COMMERCE ATTY, DOCKET NO. SEMIAL NO. 79<u>13</u>Z , , 580, 246, 55 LIST OF PRIOR ART CITED BY APPLICANT APPLICANT Donald R. Huffman, e t al. (Una noveral sheets if necessary) FILING DATE onour September 10, 1990 U.S. PATERT DOCUMENTS REMANIER DOCUMENT HUMBER DATE HITTAL HAME CLASS SUDCLASS FILING DATE ۸۸ ΑB AC ٨D ... AE ٨F AG AH A1 A J ٨K FOREIGN PATERT DOCUMENTS DOCUMENT HUMBEN DATE THANSLATION COUNTRY CLASS SUUCLASS YES NO AL AM AH OA AP OTHER PRIOR ART (Including Author, Title, Date, Perlingut Poges, Etc.) Buseletti, Dusty Objects in the Universe, pp. 89-93 AR Vinckur, et al., Measured Extinction Efficiency of Graphite Smoke in the Pegion 1200-6000A, ٨s Nature Physical Science, Vol. 243, May 21, 1973, pp. 50-51 Hargittai, et al., Quasicrystals, Networks, and Molecules of Fivefold Symmetry, pp. 239 287 AT. DATE CONSIDERED 8/17/92 EXAMINER *EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Drow line through citation if not

in conformance and not considered. Include copy of this form with next communication to applicant.

and the state of t

277.3

onia PTO-1	119		6 12	4	U.3	RHT AL	THEMT	OF COMMERCE	ATTY. DOCKE	7 110.	136	Sheet 36		
	•	PAno	LEAVI	-	_				7913Z		CO. !!!!	: (580,24	533 	
CIS							APPLIC	CANT	Donald R	. Huffman	, et a	ighty II A		
	, ,	11: 110			CUIN	ii need			FILING DATE		0	nour		
								U.S. PATENT	September	£ 10, 199				
NAMIHER		oocu				T		0.5. (A (C) (
IITIAL			1	100	1061	DAT	-		HAME		CLASS	SUBCLASS	FILING IF APPROP	TOTALE
	^^	_ _				_								
	АВ		11											
	AC		11	_ _	\sqcap	1								
	AD		11		1-1	- 						-		
	AE		十		1-1	_		···-	•					
	AF	- 5		-	+	 		•				_		
	AG		+	-	+				· · · · · · · · · · · · · · · · · · ·			-		
	АН	-			+							-		
	Al	-		-	+	44.						1		
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	-	+	- -	+	-						-	-	
		-	+			<u> </u>								
	AK													
	12000							FOREIGH PAT	ENT DOCUMEN	ITS				
		000	UMEH	THU	JMBE	ם חי	ATE	C	YNTHUC		CLASS	SUBCLASS	TRANSLA	11011
	AL												1,63	
	АМ												<u> </u>	
	AH		2							· · · · · · · · · · · · · · · · · ·	<u> </u>			
	AO				+				 					
	AP			\vdash	+	H			······································			-	-	
		<u>i</u>	_l_		OTI		100 10				1			<u> </u>
	T							T (Including Aut						
crlC	AR		Kr.	000,	, The	e chem	istry c	f the interste	ellar medium,	Phil. Trans	3. R. Soc	Lond. A	325, 1988,	
	a ver		[EP	. 40	05-4	21								
	AS		₽a	quet	te,	Dodeo	hedran	es and Allied	Spherical Mol	ecules, Ck	m. Rev.	1989, pp. 1	051~1065	
														_
			Ка	ldor	c, et	tal.,	Molecu	lar Surfaces:	Chemistry ar	d Physics o	of Gas Ph	ase Cluster	······································	
5.61	AT							dings of the F					-	·
	ER _	-	-		-	, ,			DATE CON					
EXAMIN			/	*						/ (
EXAMIN	3/2	M	n	el	n	10				8/1	(7)/2	20		

and the second of the second o

SG(AT Ourl, et al., Probing Co, Science, Vol. 242, November 13, 1986, pp. 1017-1022

EXAMINER Substitute DATE CONSIDERED 8/17/93

ΑO

Land the Control of the Control of

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Drow line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

	(U:	RIOR RT	CITED heets if	BY APPLI	CANT	7913Z APPLICANT Donald R. Huffman, ettail FILING DATE September 10, 1990							
			· · · · · · · · · · · · · · · · · · ·		U.S. PATEHT	DOCUMENTS							
TAMINER		DOCUMENT N	NABEH	DATE	·	HAME	CLASS	SURCLASS	FILING DATE				
	14												
	AB								7				
1	AC							1					
- 0	AD						-						
	AE												
	AF						-	1					
	AG						 		-				
	АН		11				-						
	AI								-				
	۲٦						_						
	AK						-						
			111.		FOREIGH PAT	ENT DOCUMENTS							
		DOCUMENT	нумаєп	DATE	C	DUIITNY	CLASS	SUBCLAS					
	AL							·	YES NO				
	АМ							1					
	на												
	AO		133										
	AP												
			OTHE	R PRIOR A	RT (Including Auti	hor, Title, Unte, Pertinant	Pages, Ele	l,					
	AR	Kn	to, Cha	ins and Oc	ains in Interst	ellar Space, Polycycli	c Aramati	: Hydrocarb	ons and				
50	AN	Ast	rophysi	cs, pp. 19	7-206 (1987	·)		· · · · · · · · · · · · · · · · · · ·					
		Sine	Smalley, flows to Parth Studies of Carbon Clusters, Carbon in the Calaxy: Studies										
	AS	·Free	m Darth	and Space	, Nasa Confere	ce Publication 306lm,	199 0, 19	9-244					
		Kee	to, The	Formation	-and-Structure	of Circumstellar and	interstell	ar Dust, Ca	ttan in the				
	AT	Gal	ану: 5	tudice fro	m Earth and Spo	nce, NASA Conference Pa	blication	3061, pp.	275-284				
EXAMINE	R	Alle		11	10	DATE CONSIDERED	3/17/	/					

10 (1984) 10 (1984) 10 (1984) 2 10 (1984) 10 (1984) 10 (1984) 10 (1984) 10 (1984) 10 (1984) 10 (1984) 10 (1984) 10 (1984) 10 (1984) 10 (1984)

oma P10- 164, 1-401	1449 5	1992	330	3.0	EPARTMENT OF COMMERC T AND TRADEMARK OFFICE	ATTY. DOCKET HO		SERIAL NO.		
		20	THE			7913Z APPLICANT Donald R. Hu		580,246	<u> 5</u>	
LIS					BY APPLICANT	Donald R. Hu	iffman, et	- ,		
	(U	na nover	of alice	ta if	песаявну)	FILING DATE		anour		
						September 10	, 1990			
AMILIER	 1					IT DOCUMENTS				
TIAL		DOCUME	T NUMB	En	DATE	HAME	CLASS	SURCLASS	FILING BATE	
	۸۸									
	AB							-		
	AC	4		11	==-1911					
	AD			11						
	AE			++		-		_		
	AF									
	AG			+						
	АН			+			<u>`</u>			
		-H-	HH	- -						
	AI			-						
	AJ			$\perp \mid \cdot \mid$						
	AK									
·			-		FOREIGH P	ATENT DOCUMENTS				
		DOCUME	мин ти	BEN	DATE	COUNTRY	CLA	SS SUBCLASS	THANSLATION YES NO	
	AL									
	АМ								-	
	нА									
	AO		177							
	AP									
			0	THER	PRIOR ART (Including)	Author, Thie, Unte, Per	Ungul Pages, E	(c.)		
		Ha	-		Magic Numbers in Ct				ica Lathana	
56-1	AR							Chaitean Filys	sics letters,	
	155		•		umber 1,2, September					
SOK	AS	1 0	Keefe,	et a	l., Production of Lar	Carbon Cluster I	ns by Laser 1	aporization,	Chemical	
	-	Pł	ysics I	ette	rs, Volume 130, numbe	r 1,2, September 26,	, 1986, pp. 17	7–19		
		I K	ėin, et	al.	, Icosahedral symmetr	y carbon cage molecu	ıles, Nature,	Volume 323, C	October 23, 198	
-1-ll	АТ									
50-11		E	500	-706						
56-1(50-K 50-((AT			-706 '	/ //	DATE CONSIDE	RED			

 $\label{eq:constraints} \mathcal{M}_{\mathcal{A}_{i}} = \mathcal{M}_$

LIS	TOF	RIO	RAR	T C	ITE	ם ם	Y APPLI		7913Z APPLICANT Donald R. Huff FILING DATE September 10,	fman, et	.580,,246 al,		
			····			η		U.S. PATEHT	DOCUMENTS				
TIAL		DOCU	HEHT	NUN	HBEN	0	ATE		HAME	CLASS	SUDCLASS	FILING IF APPRO	PRIATE
	۸۸												
	AB												
	AC.			1	11	1							
	AD			1	11							_	
			\vdash	- -	\dashv	- -							
	AE	-	+		-	_	 -						
	AF	_ -		_ _	-}-	_ _	• ·····	•					
	AG									,			
	AH												
	AI												
	AJ											_	
	AK		1-1		╁							_	
		LI.	ll			LL_		FOREIGH PAT	ENT DOCUMENTS			L	
		000	UMEN	IT N	UMBI	En	DATE	c	DUHTRY	SS SUBCLA			
	- AL		\top	П	$\neg \vdash$	T^{\dagger}		-				YES	HO
	AM		- -	H	\dashv	+	····						-\
			- -	H		- -							
	н		_ _			+		-	····				_
	10	_	_ _		_ _	11		_					_\
	AP	لــــــــــــــــــــــــــــــــــــــ											
									her, Title, Date, Pertin				
ca (AR								of Icosahedral C ₆₀			es, Chemica	aT
70			_				 -		5,6, August 8, 198				
1/1/	AS	_	M	Œlv	<i>r</i> any,	, et	al., Io	n-molecule reac	tion studies of mes	s selected	carbon clust	er ions fo	ormed
			b	1 13	sec	vapx	rizatio	, J. Chem. Phy	s. 35(1), July 1, 1	986, pp. 63	2-633		
56-1(66-1(56-1	4 4		L:	iu,	et a	al.,	Negative	e Carbon Cluste	r Ion Beams: New E	vidence for	the Special	. Nature of	E Cco
900	1		1						6, number 2, May 2,				
	MED	/	1	1		. 1	11		DATE CONSIDERE				
EXAM	HEK	7 /											

The Barrier State of the Commence

and Make and the second of Make and the second of the sec

A PTO-1	149 61	1	6 392	8	J.S. 0 A TRN	EPARTMEN	TOF COMMERCE DRMARH OFFICE	7913Z	65.31	5heri 41 580, 246	12: 53	
1.15	TOE	> ១៧១	ከ _ ለብ	TEL 1	ED	BY ADDLI	CANT	APPLICANT				
213	(11	O ROOM				necessury)	CAFII	Donald R. Huffm	an, et a	1.	'.'	
	(0.	HT AU	verm	Meth		пессаянгу)		FILING DATE		nour		
								September 10, 1	990			
							U.S. PATENT	DOCUMENTS				
MINER		poct	MEHT	нимв	ER	DATE		HAME	CLASS	SUDCLASS	FILING IF APPROF	DATE
	۸۸	_		-								
	AB								4	1		
	AC				П							
	AD				П			•				
	AE				T							
	AF							•				
	AG		П						1			
	НА		11									
	Al											
	LA										- 	
	AK		11						_			
						· · · · · · · · · · · · · · · · · · ·	FOREIGH PAT	EHT DOCUMENTS			_\	
		000	UMEN	T NUM	BEU	DATE	C	OUIITRY	CLASS	ASS SUBCLAS	SS TRANSLATIO	
	AL											
	АМ											1
	AH											1-
	AO											\ <u> </u>
	AP							•				
				O	THE	R PRIOR A	RT (Including Aut	her, Title, Date, Perlinan	Pages. Ble	.)	1	
,			- 125	-	oh =	1 Denott	ledby of Laws	Ondon Olivetone Ods		d d11-	- 3 11	
6-11	AR	-	111 7					Carbon Clusters: Sph				
•	Pos				le Re	elevance to	the Formation	and Morphology of Soo	t, The Jour	mal of Phys	sical Chem	nistr
	100		V	olume	90,	number 4,	February 13, 1	986, pp. 525-528				
,	AS							of Spheroidal Carbon	Shells, J.	Am. Chem. S	50c., 1985	5, 10
216	1 "				~~~	:00			······································			
			4	p. 77								
1/1		_	К	roto,	et a	al., C ₆₀ :	Buckminsterfull	erene, Nature, Vol. 3	18, Novemb	er 14, 1985	, pp. 162-	-163
~		1_										
XAMIN	ER		11	1				DATE CONSIDERED	,			

in conformance and not considered. Include copy of this form with next communication to applicant,

	61	Ž6	. ~					n nn andewerde	î Sheet 42	o i 56	5
PONIA PTO.	1449	FRADI	MAR	U.S.	DEPARTMEN	T OF COMMERCE	ATTY, DOCKET HO.	3	ENIAL HO.		—
LIS	STOF	_			BY APPL		7913Z . O F	50 1:118	: 580,246		
					Inconsory,		Donald R. Huff	man;"et al	•		
							September 10,		nour		ł
						U.S. PATENT		1550			
EXAMILIER		DOCUME	11 HUI	чвеп	DATE		HAME	CL ASS	SUDCLASS	FILING T	DATE
	^^										
	AB										
	AC										
	AD								_		
	AE										<u> </u>
	AF										
	AG										
	AH			11							
	AL										
	AJ										
	AK										•
						FOREIGH PAT	ENT DOCUMENTS				
	HI	росим	EHT H	UMBEI	DATE	С	OUNTRY	CLASS	SUBCLASS		
5	AL		T	П					1	- YES	HO
	АМ			\top							
	AH			Ō.,,							
	AO		Į.	TV	9				Tile Teach		
	AP						•				
				ОТП	ER PRIOR A	RT (Including Aut	hor, Tille, Date, Pertie	ient Pages, Etc	.)	_1,	
	/ .,		Bloom	nfield	d, et al.,)	Negative and Po	sitive Cluster Ions	of Carbon a	rd Silicon,	Chemical	
To 10	AR	0	Physi	ics Le	etters, Vol	ume 121, number	1,2, November 1, 1	.985, pp. 33-	37		
50-10			Rohlf	ing,	et al., Pro	cductin and cha	racterization of su	personic carl	on cluster	beams,	
100	AS		J. O	nem. I	hys. 81(7)	, October 1, 19	84, pp. 3322-3330				
	1	1770	Dietz	z, et	al., Laser	production of	supersonic metal cl	uster beams,	J. Chem. Pr	ys. 74(1)	, June
200	69 1		1981,	pp.	6511-6512		·· ···································				

*EXAMINER: Initial If reference considered, whether or not citation is in conformance with MPEP 609; Draw fine through citation if not in conformance and not considered, include copy of this form with next communication to applicant.

DATE CONSIDERED

EXAMINER

1 - 184 July 184 1 - 1 1 1 1 1 1 1 1 1 1

7-401 EV. 7-401		6		26 198	U.S PAT	RHT A	APPLI	T OF COMMERCE DRMANN OFFICE	ATTY, DOCKET HO. 7913Z APPLICANT		Sheet 43 Ental 110. 1580, 246	<u> </u>	
LIS	1 06 1	rKIL	K W	??{ 2 }}	-116		APPLI Barney)	CANT	Donald R. Huf				
	(0:	40 K	ever	n sn	CUIS	if nec	assucy.)	1	FILING DATE	1	nour		
····									September 10,	1990			
								U.S. PATENT	DOCUMENTS		-		
N3HIMA JALT		000	IMEH	T HU	MBER	DAT	E		NAME	CLASS	SUBCLASS	FILING IF APPRO	DATE
	^^	_		_ _	_ _	_							
	AB	\perp											
	AC					_							
	AD								•				
	AE			7 41									
	AF					<u> </u>		•					
	AG					1							
	НА		1										
	Al				3								
	AJ	11/										4	
	AK		1					1			1		
	· · · · · · · ·						FOREIGH PA	TENT DOCUMENTS					
		00	CUME	и ти	ONBE	en c	BTAC	\	YATHUO	CLASS	SUBCLAS		
	٨L		T		T							7 €3	- 40
	АМ				\top								
	на												1
	AO												
	AP	<u> </u>	Ц						·				
							HOR A	RT (Including An	har, Title, Date, Petila	ant Pagas, Ste	.)		
	AR		F	cotc	ک دو	o full	ecence	s, giant fullo	renes and seet, Pur	e & Appl. Cha	m. Vol. 62 ,	No. 3,	
			I	p. 4	107-4	115, 19	90						
9 G K	AS	-	F	roto	, Gi	ant fu	llerer	es, Chemistry	in Britain, January	1990, pp. 40)-43		
	AT		1	eltr	er,	J r., e	t al.	, Carbon-Molec	ules, Ions, and Clu	sters, Chem.	Rev. 1989,	89, pp. 1	.713 - 1′
	1	1	1	-									
EXVIII	IER	5	1			in.	1	11	DATE CONSIDERE	0/1-	- 10-	->	

The Mark Company of the Company of t

MIA PTO-14 EV. 7.801	49	61	2°	U.S.	DEPARTMENT AND THE	IT OF COMMERCE	7913Z		SEMIAL NO.	<u></u>		
1 167	. 0 = 1	مرتقي الم	1992) Čiter	. A. Maria de la composición	15 1117	APPLICANT	1 10 mg & 13 mg	16.580% 24	. b		
C131	(U _N	in rape	EST DE		 DBY APPL Lucconsury	·)	Donald R. Huf	fman, et	al.			
· · · · · · · · · · · · · · · · · · ·							September 10,					
						U.S. PATENT	DOCUMENTS					
THAL		росин	ENT H	MBEN	DATE		NAME	CLASS	SURCLASS	FILING IF APPROI	DATE	
	۸۸											
	AB											
	AC								n il			
	AD						·	1100				
	AE											
	AF											
	AG		l M									
	AH	1								1		
	Al											
	٨J			y) e	3 (4		
	AK											
						FOREIGH PAT	ENT DOCUMENTS					
		pocu	MENT	JOHOE	DATE	c	OUIITRY	· CLA	CLASS SUBCLAS			
	۸L		П		_					A 6.2	HO	
	ΛМ										 	
	НА									_	·	
	AO											
	AP											
				OTI	ER PRIOR	KRT (Including Au	hor, Title, Date, Perila	ant Pages, E	(te.)			
56-11	AR		Krot	o, Spe	ce, Stars,	C ₆₀ and Scot,	Science, Vol. 242, N	November 25	, 1988, pp. 1	139-1145		
56-11 56-1			Krot	o, The	stabilita	of the fullers	nes C , with r= 24.	28, 32, 36	,50, 60 and 7	70, Natime		
56-1	AS	H				1987, pp. 529-	Llerenes C _n , with r= 24, 28, 32, 36,50, 60 and 70, Nature 529-531					
			Krat	och me r	7 et al.,	Search for the	the UV and IR Spectra of Coo in Laboratory-Produced					
	\ ^T		De V	754	VI - C-10		niverse, pp. 89-93,	1000				
EXAMIN	ER	4/1		1	- //	11.	DATE CONSIDER	0 /	-/-			
		V P	101	11.	- 111 11	· /		8//	2/4-	2		

	£ 1.9	ੇ 92	PATR	BY APPLIC	OF COMMERCE	7913Z	3	Sheet 145				
1 15	FOR I	JZ ZDDB\XI	T CITED	NY APPLIC	ANT	APPLICANT	- pride	1997年13)			
CIS	TAD	EMARY	l sheets if	nceassure)	. API I	Donald R. Huff	man, et a	40 110				
	•	~				September 10,		unour				
					U.S. PATENT	· · · · · · · · · · · · · · · · · · ·						
пэніма		DOCUMENT	· ·	DATE		NAME	CLASS	S SUNCLASS FILING DATE				
TIAL			1 1 1			HAME			IF APPROPRIATE			
	^^	_ _	_ _ _					_				
	AB				· · · · · · · · · · · · · · · · · · ·							
	AC											
	AD					•						
	AE											
	AF				•							
	AG								•			
	AH											
	AI	EMT.										
	AJ											
	AK								-			
				J	FOREIGH PAT	PATENT DOCUMENTS						
		DOCUME	NT NUMBER	DATE				SUBGLAS	TRANSLATION			
	-	T I	T T T T	UNITE			CLAS	30000	YES NO			
	AL		\Box									
	AM											
	AH											
	AO	-	100	()								
	AP											
		111	OTHE	R PRIOR AR	T (Including Au	lior, Thie, Date, Perlin	ant Pages, Et	c.)				
		R	chlfing, C	ptical emis	sion studies o	of atomic, molecular	, and partic	ulate carbo	n produced from			
400	AR					J. Chem. Phys. 89(1						
			reasv, et	al., [arme (Carbon Cluster	C Ion Formation by L	asor Ablatio	n of Polysim	ido and Omebil			
56-10	AS	interes.			(1988), pp. 45			TOT TOTYER	TOE ALL GLAPIE			
					· · · · · · · · · · · · · · · · · · ·	es in Scoting Acetyl	ene and Ber	rene Flamo	ACADD Door No			
56-19 -501	(41					oine Origins, pp. 22			ACTION PLC. NO.			
	1.	1_1_	///		M. COO TOLL			19881				
EXAM	HER	5%	5.10	lula		DATE CONSIDER	7/92					
			1 1/1/1		,							

 $x_{ij} \in \overline{\mathcal{M}}_{k}(x_{ij}, x_{ij}) \text{ for } i \in \mathbb{N} \times \mathbb{N} \times \mathbb{N}$

844 D

LIS	TOFF	UN RIOR	ART C	ITED	BY APPL	ICAHT)	7913Z APPLICANT Donald R. Huf FILING DATE September 10,	fman, et a	580,246.	55		
						U.S. PATENT	DOCUMENTS					
XAMIHER HTIAL		DOCUHE	4VH TH	1BER	DATE		HAME	CLASS	SUUCLASS	FILING IF APPRO	DATE	
	۸۸		\prod									
	AB			1-1-1	···				_			
-	ΛC		\dagger		·		· · · · · · · · · · · · · · · · · · ·					
	AD		+-	$\left - \right - \left \right $			•		_			
			++				•••			ļ		
	AE .		- -	- - -		-						
	AF	_ _ -	- -	- - -	·	<u> </u>				.		
	AG		-					<u> </u>				
	АН		_ _									
	AI				<u></u>		A. 27. 54					
	LA		11									
	AK											
						FOREIGH PAT	ENT DOCUMENTS	- A				
	1	росим	ENT N	NBEN	DATE	С	OUNTRY	CLAS	SUBCLAS	YES	NO	
	AL											
	АМ		-11									
	AH											
	AO	7		The state	101	,			d		-	
	AP									_	-	
				OTHE	R PRIOR /	RT finefuling Aut	hor, Title, Unie, Petili	iaut Papas, Et	c.)	·		
- 10	AR		Gercha	rđt, e	tal., Th	e Formation of I	Polyhedral Carbon I	ons in Fuel-	Rich Acetyle	ne and		
56-1	7 ^^		Benze	ne Fla	mes, Twen	ty-Second Sympos	sium (International) on Caribust	ian/Ihe Carb	ustion		
					1988, pp.		Complexes of Spher	ovidal Carbo	n Shalle. J	Too Phone		
2-16	AS				pp. 4464		i wipinese si i pre	TAL CALC	I GREEN U	HILL CIE	10-130-2	
`						· · · · · · · · · · · · · · · · · · ·	light mass spectrom	etry of carb	on and carbo	naceous c	luster	
5610	AT						1990, pp. 7851-7662		*			
EXAMI	IER	1_1_			, , ,	16	DATE CONSIDERED					
		6			11		1	9/12	1-			

and the second of the second o

mia PTO-1- EV. 7-801	449	61	J1 20 1000	U.\$\ PAT	DEPARTME THE AND TR D BY APPL	HT OF COMMERCE ADRIANH OFFICE	7913Z		580, 246c	of <u>56</u>		
LIS	TOF	(Ki Ot	XRT	Class	BY APPL	.ICAHT	APPLICANT		· · · · · · · · · · · · · · · · · · ·			
	(U n	a Hot	Craks	ફેલ્ટિમાં ક	Luccessur	y·)			al			
				·	·		September 10,	1990				
					.	U.S. PATENT	DOCUMENTS					
TIAL		90CUH	ЕНТ Н	UMBER	DATE		НАМЕ	CLASS	SUBCLASS	FILING DATE		
	۸۸			_ _ _								
	AB				<u> </u>		····					
	AC	\perp										
	AD											
	AE -					-						
	AF	_	-		<u> </u>							
	AG	_ _	-		-	-						
_	AH			-		-						
_	A1		-	0.5	-	4						
	AJ	-	╁┼	$\left\{ -\right\} =$								
 		l_				FOREIGN PAT	ENT DOCUMENTS					
		poci	MENT	NUMBE	n DATE		DUNTRY	CLAS	SUBCLAS	TRANSLATION		
	AL	1	П	III	ä					YES NO		
-	АМ		+	1-1-		71						
	AH		11									
	AO				n							
	AP		1	+								
		<u> </u>		0110	ER PRIOR	ART (Including Aut	hor, Title, Untr. Pertin	ent Padra, Ed				
									eer Descript	ion Parcios		
	AR						oon Aggregate Ions) . Chem. 1989, 93, p					
-	-				 							
	AS	\vdash					idal carbon molecul o		steriar gran	i Tometton,		
	-	\vdash	Am	-Phyo-	Fc. 14 (19	9 99) pp. 169-1 7	9					
	АТ		-Snow	, ct a	l., A coar	ch for interotel	rotellar and circumstellar C ₆₀ , Astron. Astrophys. 213, 1909,					
			-pp-	291-29	4							
EXAMI	IER	5/	1/	1	111		DATE CONSIDERE	8/17	100			
			70	100	V M. C			0/1/	110			

and the state of the state of

277.0

LIS				BY APPL	TOF COMMERCE DRMANK OFFICE	7913Z APPLICANT Donald R. Huff FILING DATE September 10,	man, et al	580,246	55
	r				U.S. PATEHT	DOCUMENTS			-
HTIAL		DOCUMENT	HUMBER	DATE		NAME	CLASS	SUBCLASS	FILING DATE
	٨٨								
	AB								
	AC								
	AD		11+					-	
	AE								
	AF							_	
			- - -	·					ļ
	AG						· ·		
	AH								
	Al								
	YI				1				
	AK								
					FOREIGH PAT	ENT DOCUMENTS	t		
		DOCUMEN	NJBBMUH T	DATE	c	OUNTRY	CLASS	SUBCLAS	
	AL		TIT						YES NO
	АМ		111					_	
	AH		+++	-					
	AO	8		-			_		
	AP			-	-				
	1.~		OTHE		RT Uncluding Aut	hor, Title, Unte, Perlin	aut l'ages Eta	,	
	1	Mil	************	Control and the last		cular Material for	The second secon		2 (1001) 17
	AR		262-265					AUV. PACEC.	3, (1991) 10:
	-								
	AS	1 1			arbon Cluster B	sams, in Abomic and	Molecular Cl	usters, (El	seuier Science
	-	199	0) pp.	1-68					
~ / /	_ A1	Sch	malz, et	al., C ₆₀	Calturi Cages, O	remical Physics Lett	ers, Volume	130, number	3,
70-K				1986, pp. :					
EXAMI	IER	111	1	1 11		DATE CONSIDERE	0/	/	
		2/41	mill	1211			8/17/	92	

gradien in de la State (1990). The state of the state of

LIS	į,	"	12		V)//	BY APPLIC	OF COMMERCE	APPLICANT	(9,101.5	0 0			
	(U	40 AO	reral :	alicul	Ísiti	педовящу)		Donald R. FILING DATE September			our		
							U.S. PATENT	·	20, 2330		 		
XAMINEN		pocui	4EHT 1	нимві	EN	DATE	· · · · · · · · · · · · · · · · · · ·	HAME	CL	ASS	SURCLASS	FILING IF APPROF	DATE
	۸۸												
	AB												-
	AC				11								
	AD			11	T	THE R				_			
	AE			Π	11							-	_
	AF			11	\Box								
	AG												
	AH		11	11	-					· · · · · · · · · · · · · · · · · · ·			_
	Al												·
	K)			NEW									
	AK												-
							FOREIGH PAT	ENT DOCUMENT	s ;		1		-,
		000	JMENT	r NUM	BEN	DATE	c	DUNTRY	c	LASS	SUBCLASS	THANSL	A 110#
1	AL				J					· · · · · · · · · · · · · · · · · · ·			
	АМ												
	AH												-
	AO									······································			
*·····	AP		Ш										
								ior, Title, Date, P					
11.16	AR							ubmers in C + a					
561C		\sqcup	Expe	erime	ntal	Observation	ons, Chemical	Physics Letters	, Volume 132,	nunt	er 1, Nove	ber 28,	1986,
60.19	AS					A COLUMN TO SERVICE AND ADDRESS OF THE PARTY	The second secon	iblings, and Soc					
			Jour	mal (es?, of.G	Proceeding eachysical	of the Seven Research, Vol	teenth Lunar and 91, No. 813, 1	d Planetary S November 30.	icienc	e Conferee	nce, Part	1,
7001			Heat	ch, 11	he Fo	ormation of	Long Carbon	Chain Molecules	during Laser	Vapo	rizaiton o	E Graphit	e,
				A-m (T	hem.	Sc. 1987,	109, pp. 359						
sul	AT		J. 1	AIII. CI									
SU(J. 1	, ,	.,	11		DATE CONSIG	S/17		7		-

OMA PTO-14	٠.	9			T OF COMMERCE	7913Z		Sheet 51 7 61 56 SERIAL NO. 580, 246 12: 55				
LIST) BY APPLI (necossory)		Donald R. Huffman, et al.						
		····				September 10, 1990						
·				·	U.S. PATENT	DOCUMENTS						
XAMINER		DOCUMENT	T HUMBER	DATE		NAME	CLASS	SUDCLASS	FILING DATE			
	^^		_ _ _									
	AB								·····			
	AC	-										
	AD							11 3				
	AE					•						
	AF											
	AG											
	AH							10				
	AI											
	A.J		14-10					-				
	AK											
	,,				FOREIGH PAT	ENT DOCUMENTS	· · · · · · · · · · · · · · · · · · ·					
		DOCUME	BOMUH TH	DATE	c	OUNTRY	CLASS	SUUCLASS	TRANSLATION YES NO			
	AL			7								
	АМ											
·	AH											
	AO						130					
	AP											
	_	-	OTII	ER PRIOR AI	RT (Including Aut	ior, Title, Unte, Pertir	ent Pages, Ble	:.)				
111	AR	Ò	Cyvin, et al., Molecular Vibrations of Footballene, Chemical Physics Letters, Volume 143,									
2011		n	number 4, January 22, 1988, pp. 377-380									
c//C	AS					ying carbon cluster						
701		J	pecific r . Chem. I	eutral frac hys. 88(4),	ment loss from February 15,	metastable reactio 1988, pp. 2809—2814	ns of mass s	elected CH, r	150,			
961 961	AT	0	bx, et al	., Carbon c	clusters revisi	ted: The "special"	behavior of	C ₆₀ and larg	e carbon clus			
70-11		J	. Chem. I	hys., Vol.	88, No. 3, Feb	wary 1, 1988, pp.	1588-6907					
EXAMIN	ER	51	//	11		DATE CONSIDER	1/12/-					
		U	unz	vyi			11/192	_				

The State of the Control of the Control of

Maria ya Karani a Maria Ma Maria Ma

onia P10-1-		ON P	Jui		, ** ~ *	W 14 E	AND THA	TOF COMMERCE DRMANH OFFICE	7913Z	(1	580,246	: 55 : 55	b		
Lis	TOF	BBIU BBIU	26	י עד ר	.ITF	D RY	(APPI	IC ANT							
4,0	(1)	HO BO	997	r alie		il ne	C APPL)	Donald R. Huffman, et al.						
			MADE	HI K					September 10,	1990		<u> </u>			
XAMIHER	 1							U.S. PATENT	DDCUMENTS						
HITIAL	\dashv	DOCUMENT HUMBEN				0	ATE		NAME	CLASS	SURCLASS	FILING DATE			
	^^	-	- - -	- -	- -	-									
	AB	_ -		- -		-									
			+	_	-						_				
	AD .		- -	_		_ _			·						
	AE .			- -	-										
	AF		-	- -		- -		·			_	·[
	AG	_	- -	-	1-1	- -		ļ				-			
	AH		- -	_		- -						ļ			
	A1			-	+							-			
	AK	\vdash	-		\perp	-									
	^K			LL	1	Ш									
	1	1							ENT DOCUMENTS			F			
	AL	500	UMER		Т		DATE	C	DUNTRY	CLAS	S SUBCLASS	YES	HO		
	AM	-	-	-	+	H									
		-	- -	-	\perp	- -						_			
	AH	-	_ _	\sqcup	- -	- -									
	AO	_	_ _	-	_ _	- -									
	AP	J	<u> </u>										<u> </u>		
			1/-						ior, Title, Unte, Perlin						
5611	AR								erence and other La						
	_	-	Chemical Physics Letters, volume 139, number 3,4, August 28, 1987, pp. 233-238												
56 (¹	As Heath, o					ath, et al., The UV absorption spectrum of C ₆₀ (buckminsterfullerene): A narrow band at									
	_	-				J. Chem. Phys. 87(7), October 1, 1987, pp. 4236-4238									
	L		Ka	ldor	, et	al.	, The b	asics of molecu	lar surfaces, Chemb	ech, May 198	77, pp. 300-3	07			
5610	^1														
SG (1_				1			· .	DATE CONSIDERS	9					

o e 🚧 objection in the Magney (1997). The first of the original of the second of the original of the original of the original of the original of the

DEV. 7-401	44°(61	JUN 26 1992 PRIOR ARTISTED	DEPARTMENT OF COMMERCE HT AND THADRMANH OFFICE	7913Z		Sheet	
ris.	T OF	PRIOR ARTITED	BY APPLICANT	Donald R. Huffman	o et al		
	(U	no receipt alicula i	l nec assney)	FILING DATE	, et al	nour	<u> </u>
				September 10, 199			
			U.S. PATENT	DOCUMENTS	······································		
XAMINEN		DOCUMENT NUMBER	DATE	HAME	CLASS	SUBCLASS	FILING DATE
	۸۸						
	AB						
	AC						
	AD	cultivity explained	1-11-1				
	AE						
	AF						
	AG						
	НА						
	Al					1211	
1+=0	A3						
	AK						
				TENT DOCUMENTS			
		DOCUMENT NUMBER	DATE	OUNTRY	CLASS	SUBCLASS	THANSLATION YES NO
	AL						
	АМ						100
	АН						
	AO						
	AP						
		01110	R PRIOR ART (Including Aut	lint, Title, Date, Pettingut F	ados. Ble	.)	
21	AR	Iijima, The	e 60-Carbon Cluster has b	en Revealed?, J. Phys. (Chem. 198	37, 91, pp.	3466-3467
561(AS	Gerhardt, e	t al., Polyhedral Carbon	Ions in Hydrocarbon Fla	nes, Chen	mical Physic	al Letters,
7000		Volume 137,	number 4, June 19, 1987,	pp. 306-310			
SG ((1	Hollow mole	cules, New Scientist, Nov	venter 3, 1966, pp. 118-	119		
EXAMIN	ER	Skal :	611	DATE CONSIDERED	la-		
*EXAMI	NER:	Initial if reference co	onsidered, whether or not cital . Include copy of this form w	Inn is in conformance with M	/9 ; rer 609;	Drow line thro	ough ettotion if n

The Marine State of the State of

DATE CONSIDERED *EXAMINER: Initial II reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not In conformance and not considered. Include capy of this form with next communication to applicant.

EXAMINER

Land Maria Company of the Company of

MOLECULES BETWEEN 200 AND 850 nm WAVELENGTH, Surface-Science 156 (1985)

mia PTO-1 EV, 7-001	449	13	13.16	, m,	.5. 0	HEMARTHEH ANT UNA T	TOF COMMERCE	ATTY. OOCKET HO.		1	Sheet55			
								7913Z 580,246,						
LIS	TOF	PRIO	R AR	rici t	ÉD	BY APPL	ICAHT	APPLICANT						
	(U	80 RU	veral	slicet	s if	necossny)	Donald R. Huffman, et al.						
								September 10	. 1990	1				
							U.S. PATENT		, 1550		· · · · · · · · · · · · · · · · · · ·			
AMINER		DOCU	MENT	HUMBI	EN	DATE		HAME	CL	ASS	SUDCLASS	FILING IF APPRO	DATE	
			П	Hill.	\vdash			-				IF APPRO	PRIATE	
				-	_ -									
	AB													
	AC													
	AD		11	11	11	1		•						
	AE		1-1-		+					·····				
	AF		1-1-	╂┼	-	· · · · · · · · · · · · · · · · · · ·					-			
		-	- - -	- -	+	·								
	AG		11	44	11						1	<u> </u>		
	HA		11	11									-/	
	AI											4		
	7. Table 1													
	\ \AJ	1 1												
	AK			-	+		1							
							FOREIGH PAT	ENT DOCUMENTS						
		000	. Namo:	T HUMI	e E N	DATE	T	ENT DOCUMENTS		CLASS	SUBCLAS		A 110H	
		000	- Hamus	r HUMI	BEN	DATE	T			CLASS	SUBCLAS	YES	A TIOU	
	AK	DOC	OMEN	T HUMI	BEN	DATE	T			CLASS	SUECLAS			
	AK	DOC	имен	T NUMI	een	DATE	T			CLASS	SUBCLAS!			
	AK		нэмо:	F NUMI	een	DATE	T			CLASS	SU BCL AS			
	AK AL AM		UMEH	FNUMI	BEN	DATE	T			CLASS	SUBCLAS			
	AK AL AM AN		нзми	T NUMI	BEN	DATE	T			CLASS	SU BCL AS			
	AK AL AM AN		ОМЕН				C	OUNTRY						
	AK AL AM AN			0	THE	R PRIOR A	RT (Including Aut	OUHTRY Itar, Title, Untr. Pert	Ingut Pages	ı, Etc.		YES	NO	
76-11	AK AL AM AN			0	THE	R PRIOR A	RT (Including Aut	OUNTRY	Ingut Pages	ı, Etc.		YES	NO	
F641	AK AL AM AN AO		Krot	o co et	THE:	R PRIOR A	RT (Including Aut	OUHTRY Itar, Title, Untr. Pert	Ingut Pages	ı, Etc.		YES	NO	
641	AK AL AM AN AO		Krot	0 co et	THE:	R PRIOR A	RT (Including Aut	nor, Title, Unte, Pert	ure, Vol	ume	318, Nov	ember 1	4, 19	
561	AK AL AM AN AO		Krot pp.	to et	THE: al	R PRIOR A	RT (Including Aut	fullerene, Nat	ure, Vol	ume	318, Nov	ember 1	4, 19 4, 19	
56-(AK AL AM AN AO AF		Krot pp.	to et	THE: al	R PRIOR A	RT (Including Aut	nor, Title, Unte, Pert	ure, Vol	ume	318, Nov	ember 1	4, 19 4, 19	
56-1	AK AL AM AN AO AF		Krot pp. Kirl Blo	o et 162:	THEI : all	R PRIOR A	Buckminster	fullerene, Nat	ure, Vol	ume hird	318, Nov	ember 1	4, 19 4, 19	
56-1	AK AL AM AN AO AP		Krot pp. Kirl Blo	o et 162-cod, od, offler	tile: al	R PRIOR A	RT (Including Aut Buckminster Clopedia of (and Anticoac	fullerene, Nat Chemical Technologulants to Caro	ure, Vol	ume hird	318, Nov. Edition, Agents. p	ember 1	4, 19 4, 19	
56-(1) 56-(1) EXAMI	AK AL AM AN AO AP		Krot pp. Kirl Blo	o et 162-cod, od, offler	tile: al	R PRIOR A	RT (Including Aut Buckminster Clopedia of (and Anticoac	fullerene, Nat	ure, Vol	ume hird	318, Nov. Edition, Agents. p	ember 1	4, 19 4, 19	

The State of the S

	·	-/
or l	26	
Willes.	1992	eril/
PONA PTO-1449	COUNTY	. · ·
l ter o		

U.S. DEPARTMENT OF COMMERCE

ATTY. BOCKET HO. 7913Z

580,246

LIST OF PRIOR ART CITED BY APPLICANT

(Use several shouts if necessary)

Donald R. Huffman, et al.

FILING DATE

GROUP

EXAMINER	1	pocu	MEHT	HUME	ER	DATE	JAME!		SUDCLASS	FILING DATE	
			П	TT				CLASS		IF APPROPRIATE	
	^^	_ _	1-1-	╌	_ _ -						
	AB										
	AC		11								
	AD					·			-		
	AE			\sqcap			•				
	AF										
	AG								-		
	АН					-			· · · · · ·		
•	AI									l	
	LA										
	AK										
					لحلحا	<u> </u>	FOREIGH PATENT DOCUMENTS				
		000	UMEH	IT HUI	лэвм	DATE	COUNTRY	CLASS	SUBCLASS		
	AL				TT		The second secon		<u> </u>	YES NO	
	АМ				\vdash						
	AH		-								
	AO		-		+		·				
	AP				+					-	
	1		Ш.	4	OTHE	PRIOR ART	(Including Author, Title, Unic, Petiin				
566	AR		THE	IR P	OSSI	BLE RELEVA	VITY OF LARGE CARBON CLUSTANCE TO THE FORMATION AND	MORPHOLOGY	OF SOOT.	The Journal	
			1		• •		v. Volume 90. Number 4. Fo				
96J(AS		Cur	<u>l et</u>	al.	, FULLEREN	NES, Scientific Americal,	October 19	91, pp. 5	4-64	
			-								
560	< ^1	-	How	<u>ard</u>			renes C ₆₀ and C ₇₀ IN FLAM pp. 139-141	ES, Letters	to Natu	ce, Volume	
1000	1			. —							